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1877

ADMITTED IN ACCORDANCE WITH THE PROVISIONS OF THE ACT THIRTY FIRST  
VICTORIA, CHAPTER TWELVE, BROTHERS MISSION.

PRINTED BY ORDER OF THE HOUSE OF COMMONS



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# ANNUAL REPORT

OF THE

# MINISTER OF PUBLIC WORKS,

FOR THE

FISCAL YEAR 1ST JULY, 1876 TO 30TH JUNE,

1877

ON THE WORKS UNDER HIS CONTROL.

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SUBMITTED IN ACCORDANCE WITH THE PROVISIONS OF THE ACT THIRTY-FIRST  
VICTORIA, CHAPTER TWELVE, SECTION NINETEEN.

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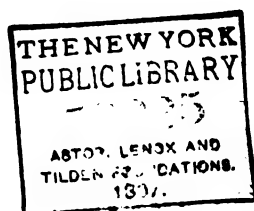


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**REPORT**  
**OF THE**  
**MINISTER OF PUBLIC WORKS,**  
**FOR THE**  
**FISCAL YEAR ENDED 30<sup>TH</sup> JUNE, 1877.**

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7-A



*To His Excellency the Right Honorable Sir Frederic Temple, Earl of Dufferin, Viscount and Baron Clandeboye of Clandeboye, in the County Down, in the Peerage of the United Kingdom, Baron Dufferin and Clandeboye, of Ballyleidy and Killeleagh, in the County Down, in the Peerage of Ireland, and a Baronet, Knight of The Most Illustrious Order of Saint Patrick, and Knight Commander of the Most Honorable Order of the Bath, Governor General of Canada, and Vice Admiral of the same :*

**MAY IT PLEASE YOUR EXCELLENCY :**

I have the honor to submit the Annual Report of the Department of Public Works, for the year 1876-7, in accordance with the Statute.

**A. MACKENZIE,**

*Minister of Public Works.*

**DEPARTMENT OF PUBLIC WORKS,**

**Ottawa.**

**31st December, 1877.**





# REPORT.

1876-1877.

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To the Honorable

ALEXANDER MACKENZIE,

&c., &c., &c.,

Minister of Public Works.

SIR,

I have the honor herewith to lay before you the Annual Report of the Department compiled in conformity with your instructions.

The report sets forth the transactions and general expenditure with the cost of maintenance of the various Public Works during the fiscal year ended 30th June 1877.

Appendix No. 1, pages 3-6, shews this expenditure in detail.

The Annual Reports of Superintendents, with general and special Reports from the Departmental Engineers, are given in the Appendices.

The works under the control of the Department are as follows:—

THE CANALS.

WORKS ON NAVIGABLE RIVERS.

HARBORS AND PIERS.

SLIDES AND BOOMS.

PUBLIC BUILDINGS.

GOVERNMENT RAILWAYS.

## CANALS.

The Canals of the Dominion have been constructed on the following routes of inland navigation :—

1. The River St. Lawrence and Lakes.
2. The Ottawa, to the City of Ottawa.
3. The Rideau navigation from Ottawa to Kingston.
4. The River Richelieu to Lake Champlain.
5. St. Peter's Canal, Cape Breton, Nova Scotia.

### RIVER ST. LAWRENCE AND LAKES.

This navigation extends from the Straits of Belle-Ile, by the River St. Lawrence through Lakes Ontario, Erie, St. Clair and Huron to Duluth, at the head of Lake Superior, a distance of 2,384 statute miles.

Lake Superior is about 600 feet above the highest tidal flow of the St. Lawrence, at Three Rivers.

The canals on the route are the Lachine, Beauharnois, Cornwall, Farran's Point, Rapid Plat, Galops and Welland. Their total length is 70.83 miles; total lockage, 536½ feet; number of locks, 54.

The St. Mary Canal is situated on the United States side of the channel, and was constructed under that Government to avoid the St. Mary Rapid. It connects Lakes Huron and Superior. It is 1.07 miles long, and has 18 feet lockage, with a depth of water on sills of 12 feet.

A new lock is, however, in course of construction which will have 16 feet on the sills at the lowest range of Lake Superior.

A statement of distances, and sections of navigation, from the Straits of Belle-Ile to Duluth, at the head of Lake Superior, are appended. (Appendix 2, page 7, table A.)

### LACHINE CANAL.

Length of Canal.....	8½ statute miles.
Number of locks.....	5
Dimensions of locks.....	200 feet by 45 feet.
Total rise of lockage.....	44½ feet,
Depth of water on sills { at two locks.....	16 "
{ at three locks.....	9 "
Breadth of canal at bottom.....	80 "
Breadth of canal at water surface.....	120 "

This canal extends from the City of Montreal to the Village of Lachine, overcoming the St. Louis Rapids, the first series of rapids which bar the ascent of the River St. Lawrence. They are 986 miles distant from the Straits Belle-Ile.

This canal was closed on the 2nd December, 1876, and opened on the 7th May, 1877.

The navigation was interrupted for 24 hours on 11th June owing to a leak in the weir at Basin No. 2. The water was drawn off on five occasions in May and June for the purpose of repairing leaks in the upper sections.

The supporting piers of the Lachine booms have been repaired and a stop gate built at Lock No. 5.

The superstructure to the weir bridge, Basin No. 2, and the supply weir, Lachine were rebuilt.

The superstructure of pier below Lock No. 5 renewed.

The walls at Locks Nos. 1 and 2 and of the weirs at Basin No. 2 were pointed. Concrete was placed under the flume in Basin No. 2. The flooring of the tail race below weir at Lock No. 4 sheeted with plank.

Gates in Locks Nos. 3 and 4 were provided with suspension gear.

The wharves and bridges have been generally repaired and new snubbing posts placed. (Appendix 3, page 9.)

#### NEW WORKS.

The locks on the enlarged canal will be 270 feet between gate quoins and 45 feet wide at bottom.

There are two locks between the Harbor of Montreal and Wellington Bridge; lock one at the harbor entrance, and lock two at the Mill Street crossing. These locks will have a depth of 18 feet on the sills and the Canal with its basins between these two points will have a depth of 19 feet. The remaining three locks located at St. Gabriel, Côte St. Paul, and Lachine will have a depth of 14 feet on the sills. All permanent structures in this distance have their foundations so placed that the prism of the canal may be eventually deepened to 15 feet without disturbing them, should the additional two feet in depth be held desirable.

The two lower locks will be connected by a basin 540 feet long with an average width of 260 feet. The basin known as No. 2 Basin will be enlarged at its south west end. Wellington Basin communicates with Basin No. 2 and extends to St. Etienne Street, Point St. Charles. It is 1,210 feet long and 225 feet wide. A second basin is projected of the same length and depth and 250 feet wide, parallel to it.

From below Wellington Bridge to Côte St. Paul Lock, the new canal will have an average width of 200 feet, and from that lock to Lachine the average width will be 150 feet.

The new locks are located adjoining the old locks as independent structures, and hereafter the canal will be navigable through the double range of locks with double entrances at Montreal and at Lachine.

The work is divided into eleven sections, as follows :

Sections 1 and 2 include two locks with intervening basin, the construction of Wellington Basin and enlargement and deepening of Basin No. 2.

Contractors, Messrs. James Worthington & Co.

At the close of the fiscal year most of the masonry was laid and the work is now being carried on.

The walls in Basin No. 1 are nearly completed, with the connections with Lock No. 1. The lock walls of No. 2 are nearly finished.

The walls for submerged gate and bridge abutments are well advanced.

The excavation in Basin No. 2 will be completed during the season of 1877.

Wellington Basin is completed with the exception of some coping to the walls.

Section 3.—From below Wellington Bridge to a short distance above St. Gabriel Lock; distance 4,200 feet. Contractors, Messrs McNamee, Gaherty and Fréchette.

Most of the excavation capable of being taken out by dredging has been done. Much of the dock wall with the south abutment of the new Wellington Bridge have been completed. The old St. Gabriel Lock has been rebuilt with a new wing wall between the old and new locks. The abutments and centre pier for the fixed bridge above the new weir have been erected.

Section 4.—From above Saint Gabriel Lock to above railway bridge; distance, 3,800 feet. Contractors, Messrs. Whitney and Doty.

The excavation has been for the most part taken out and the slope wall constructed. Brewster's Road Bridge is completed. Steps are being taken to rebuild the Grand Trunk Bridge.

Section 5.—From above railway bridge to below St. Paul's Lock; distance, 4,200 feet. Contractor, Mr. Alphonse Charlebois.

This section consists of excavation and side walls, with the River St. Pierre siphon culvert.

Satisfactory progress has been made with the work.

Sections 6 and 7.—From below St. Paul's Lock a distance of 10,000 feet.

Contractors, Messrs. Wm. Davis and Sons.

These sections include rebuilding Côte St. Paul Lock, which was finished by the opening of the navigation. The excavation has been satisfactorily carried on. The excavation of the new lock pit is almost completed.

The north abutment of Côte St. Paul Bridge has been built.

Section 8.—From the end of Section 7 a length of 7,500 feet.

Contractors, Messrs. O'Brien, Sullivan and Co.

This work consists of excavation and slope walls. The progress made last season was not perfectly satisfactory. During the winter months, the excavation was continued and slope walls commenced.

Section 9.—From the end of Section 8 to below guard lock; length, 6,000 feet. Contractors, Messrs. John Lyons and Co.

Good progress was made in the removal of the rock and the construction of dry walls.

Section 10.—From below guard lock to river entrance; length, 1,400 feet. Contractors, Messrs Rodgers, Kelly and Co.

The earth excavation is complete and the rock excavation in the lock pit nearly finished.

Section 11.—Forming river entrance and harbor at Lachine; length, 6,200 feet. Contractors, Messrs. William Davis and Sons.

1060 feet of crib work of the inner face of entrance pier has been sunk, and of the outer side 600 feet have been placed in position. (Appendix 3, pages 10—16.)

#### BEAUHARNOIS CANAL.

Length of canal.....	11½ statute miles
Number of locks.....	9
Dimensions of locks.....	200 feet by 45 feet.
Total rise of lockage.....	82½ feet.
Depth of water on sills.....	9 "
Breadth of canal at bottom.....	80 "
Breadth of canal at water surface.....	120 "

This canal commences on the south side of the St. Lawrence, 15½ miles from the head of the Lachine Canal. It connects Lakes St. Louis and St. Francis, and avoids the three rapids known respectively as the "Cascades," "Cedars" and "Coteau."

This canal closed on the 29th November, 1876, and opened on the 5th May, 1877.

The lock gates have generally been repaired and some spare gates placed in reserve, and an additional number is reported as now required.



It has been necessary to place concrete under the platform of the lower mitre sills at locks Nos. 12 and 13, and the walls of Locks Nos. 6, 7, 8, 9 and 13 have been partially rebuilt.

The sluice gates have been repaired; the swing bridges, weir bridges and the farm bridges have been placed in order.

The dwelling houses have been kept in good condition, and a new shed and a small store house have been constructed.

The dyke at Hungry Bay has been raised.

The banks and slope walls of the Canal have been maintained, and the raceways and culverts have been cleaned. (Appendix 3, pages 16 and 17.)

### CORNWALL CANAL.

Length of canal.....	11½ statute miles.
Number of locks.....	7
Dimensions of locks.....	200 feet by 55 feet.
Total rise of lockage.....	48 feet.
Depth of water on sills.....	9 "
Breadth of canal at bottom.....	100 "
Breadth of canal at water surface.....	150 "

From the head of the Beauharnois to the foot of the Cornwall Canal, there is a navigable reach through Lake St. Francis of 32½ miles.

The Cornwall Canal surmounts the Long Sault Rapids.

The canal was closed from the 8th December 1876 to the 26th May 1877.

The navigation has been uninterrupted.

The gates, weirs and bridges have been repaired; the slope walls raised; ditches and drains cleaned out. (Appendix 4, page 31.)

### NEW WORKS.

The work for the new enlargement placed under contract consists of the construction of two locks with regulating weir, and the formation of a new lower entrance. Contractors, Messrs. Gordon, Woodward and Chamberlin.

The entrance channel will be south of the present line, and the centre line of the new locks 300 feet from the present centre line. The water level of the Cornwall reach, between Locks Nos. 17 and 18, will be raised two feet, the descent to the level of the St. Lawrence being by the two locks under construction. Entrance piers will be likewise made.

The work performed consists of excavation, embankment and stone revetment wall. Timber and stone for the locks have been delivered and much of the stone cut, but the foundations have not been commenced. The supply weirs will be completed by the autumn of 1877.

### WILLIAMSBURGH CANALS.

The Farran's Point, Rapid Plat and Galops Canals are collectively known as the Williamsburgh Canals.

#### FARRAN'S POINT CANAL.

Length of canal.....	$\frac{3}{4}$ mile.
Number of locks.....	1 "
Dimensions of lock.....	200 feet by 45 feet.
Total rise of lockage .....	4 feet.
Depth of water on sills.....	9 "
Breadth of canal at bottom.....	50 "
Breadth of canal at water surface.....	90 "

From the head of the Cornwall Canal to the foot of Farran's Point Canal, the distance on the St. Lawrence is 5 miles. This canal enables vessels ascending the river to avoid the Farran's Point Rapids. Descending vessels run the rapids with ease and safety.

It was closed 5th December, 1876 ; opened 1st May, 1877.

The navigation was uninterrupted.

The lock gates have been repaired and the stone protection to banks completed. (Appendix 5, page 32.)

#### RAPID PLAT CANAL.

Length of canal.....	4 miles.
Number of locks.....	2
Dimensions of locks.....	200 feet by 45 feet.
Total rise of lockage.....	11 $\frac{1}{2}$ feet.
Depth of water on sills.....	9 "
Breadth of canal at bottom.....	50 "
Breadth of canal at surface of water.....	90 "

From the head of Farran's Point Canal to the foot of Rapid Plat Canal, there is a navigable stretch of  $10\frac{1}{2}$  miles. This canal is taken by ascending vessels to avoid the Rapid Plat Rapids. Descending vessels run the rapids safely.

Closed 5th December, 1876 ; opened 1st May, 1877.

The navigation has been uninterrupted.

Some repairs have been made to the locks and gates, and the stone walls have been maintained. (Appendix 5, page 32.)

#### GALOPS CANAL.

Length of canal.....	7 $\frac{1}{2}$ miles.
Number of locks.....	3
Dimensions of locks.....	200 feet by 45 feet.
Total rise of lockage.....	15 $\frac{1}{4}$ "
Depth of water on sills.....	9 "
Breadth of canal at bottom.....	50 "
Breadth of canal at surface of water.....	90 "

From the head of Rapid Plat Canal to the foot of the Galops Canal, the St. Lawrence is navigable for  $4\frac{1}{2}$  miles. This canal overcomes the rapids at Point aux Iroquois, Point Cardinal, and the Galops.

Closed 5th December, 1876 ; opened 1st May, 1877.

The navigation has been uninterrupted.

The gates have been repaired and the pier at the foot of Point aux Iroquois has been rebuilt. (Appendix 5, page 32.)

#### WELLAND CANAL.

This Canal connects Lakes Ontario and Erie. Its summit level, 8 feet above Lake Erie, is supplied from the Grand River by a navigable feeder. There is a descending branch from the feeder to Port Maitland, Lake Erie, and also descending branches at the River Welland.

##### MAIN LINE FROM LAKE ONTARIO TO LAKE ERIE.

Length of canal.....	27 miles and 1,099 feet.
Pairs of guard gates.....	3
Number of lift-locks.....	27
Dimensions of locks.....	$\left\{ \begin{array}{ll} 2 \text{ locks of } 200 \text{ feet by } 45 \text{ feet.} \\ 24 \text{ " } 150 \text{ " } 26\frac{1}{2} \text{ " } \\ 1 \text{ " } 230 \text{ " } 45 \text{ " } \end{array} \right.$
Total rise of lockage.....	330 feet.
Depth of water on sills.....	10 $\frac{1}{4}$ "

## RIVER WELLAND BRANCHES.

Length of canal:—Port Robinson Cut to River Welland. 2,622 feet.

“ From Welland Canal to River Welland, *via* lock at Aqueduct..... 300 “

“ Chippawa Cut to River Niagara..... 1,020 “

Number of locks:—One at Aqueduct and one at Port Robinson..... 2

Dimensions of locks..... 150 by 26½ feet.

Total lockage from Welland Canal down to River Welland..... 17 feet.

Depth of water on sills..... 9 ft. 10 in.

## GRAND RIVER FEEDER.

Length of canal..... 21 miles.

Number of locks..... 2

Dimensions of locks..... { 1 of 150 by 26½ feet.  
1 of 200 by 45 “

Total rise of lockage..... 7 to 8 feet.

Depth of water on sills..... 10¼ feet.

## PORT MAITLAND BRANCH.

Length of canal..... 1½ miles.

Number of locks..... 1

Dimensions of lock..... 185 by 45 feet.

Total rise of lockage..... 8½ feet.

Depth of water on sills..... 11 “

The breadth of the main line of this canal, at present, varies as follows:—

Section.	Distance.	Breadth at bottom.	Breadth at surface.
	Miles.	Feet.	Feet.
Dalhousie to Thorold.....	9½	70	110
Thorold to Allanburgh.....	3½	26	66
Allanburgh to Ramey's Bend.....	12½	50	90
Ramey's Bend to Port Colborne.....	1½	58	58
Port Colborne to outer end of West Pier.....	¾	90	.....
Port Robinson to Chippawa, River Welland .....	8½	.....	200
Danville navigable feeder .....	21	26	60 to 70
Port Maitland Branch.....	1½	45	85

It was closed 15th December, 1876 ; opened 17th April, 1877.

There was one interruption to navigation of 27 hours by the head gates of Lock No. 21 being carried away on 18th June.

The water supply has been good during the year.

The sum of \$355.11 has been collected in fines during the year.

Sixteen new gates have been placed in reserve.

Repairs to gates have been made at Lock No. 1.

The waste weirs at Locks Nos. 1 and 19, and the third waste weir have been repaired.

The swing bridges at St. Catharines, at Weaver's Point, at Locks Nos. 5, 7, 15 and 24, and at Marshville have been placed in repair.

Repairs have been executed to the buildings at Lock No. 2 ; to watchhouse Lock No. 3 ; to the Lock Tenders' houses at Locks Nos. 4, 6, 10, 11, 17, 20 and 24 ; to the houses at Locks Nos. 12 and 14 ; and additions have also been made at Lock No. 19.

The tow path at Lock No. 4 has been placed in good condition.

The floats at Locks Nos. 4, 7, 8, 9, 10, 11, 12, 13, 14, 15 and 17, and those from Ramey's Bend to Port Colborne were repaired.

Repairs to the Stationary Bridges at Locks Nos. 5 and 11 were executed.

New bridges have been built at Lock No. 11 ; over weir at Lock No. 34, and over the upper waste weir.

Stone walls were built at Locks Nos. 16, 18 and 19.

Two new gates were put in at Lock No. 21.

The bank at Lock No. 26 was repaired on account of damages from water.

The west pier at Port Colborne has been partially renewed.

The Dunnville Guard Lock has been renewed.

The canal generally is in a good state of repair. (Appendix 6, pages 33-36.)

#### NEW WORKS.

The scheme of the new work is the ultimate establishment of a navigation with locks 270 feet long, 45 feet wide with 14 feet depth on the sills, the Canal having a width of 100 feet at bottom with a depth of 15 feet, the water supply to be obtained from Lake Erie.

For the present, the depth of the Canal between the locks is 13 feet. The locks which can hereafter be raised with moderate expense are at present constructed with 12 feet on the sills.

The entrance and other locks not coming within this category are constructed with a depth of 14 feet.

The present line of canal is  $27\frac{1}{2}$  miles ; the new line of canal will be  $26\frac{1}{2}$  miles.

The present entrance Port Dalhousie has been retained as the outlet, that Harbor being easy of access, and affording good shelter to vessels, and being unobstructed by reefs and shoals. Moreover it is open throughout the winter except in extreme weather.

An entirely new line of location has been followed from Port Dalhousie to Allanburgh, a distance of  $11\frac{3}{4}$  miles. From Allanburgh upwards, the old canal is being widened and deepened.

The difference of level between Lakes Ontario and Erie, can only be generally stated, as the influence causing the variation in the height of water is not identical in character and in time on the two Lakes. The mean has been determined as 326 $\frac{1}{2}$  feet. This height is overcome on the present canal by 25 locks. On the enlarged canal there will be 24 locks.

The new entrance lock at Port Dalhousie is on the eastern bank of the creek.

Lock No. 2 is situated at the mouth of May's Ravine, and this and the succeeding Locks Nos. 3, 4 and 5 constitute a group by which the level of the lower plateau is attained. The interval between the locks is about 1,200 feet.

The distance from Lock No. 5 to Lock No. 6 is about 4,000 feet. Locks Nos. 6 and 7 are about 1,000 feet apart.

Locks Nos. 8 and 9 are near the crossing of the Queenston Road at the St Catharine's Cemetery.

All the locks up to No. 9 have 14 feet lift.

From Lock No. 4, to Lock No. 11 there is a continuous straight line 4.4 miles in length. Between Locks Nos. 11 and 12 the canal deflects 20 degrees to the west. The succeeding Locks Nos. 12, 13, 14, 15 and 16 are on the same straight line, which is about 4,500 feet in length. After Lock No. 11, the intervals between the locks have been determined so as to admit two of the largest vessels on the route passing with ease.

The rise from Lock No. 11 to Lock No. 24 which takes place in a distance of 14,100 feet, is 196 feet.

The location follows the Niagara escarpment to the ravine behind Thorold and is taken through the dividing ridge to Beaver-dam valley.

Between the locks where practicable, extensive reserve basins communicating with each other by weirs, are in course of construction.

The work has been divided into 36 sections, 27 of which are under contract.

The sections unlet on the 30th June, 1877, nine in number are, Nos. 17, 18, 19, 20, 27, 28, 33, 34 and 35. They will be placed under contract during the autumn of 1877.

These sections embrace the following works:—

*Sections 17 and 18.* 7,265 feet in length between Thorold and Allanburg, include the formation of canal, the construction of a lift-lock, building abutments and piers for two road bridges, the pier and abutments for a bridge to carry the line of the Welland Railway, the works connected with a set of guard gates, two arched culverts, a regulating weir and raceway, towing path and bridges.

*Sections 19 and 20,* one mile and a quarter in length, between Thorold and Allanburg, include the enlargement of the canal with the formation of two arched culverts, the construction of abutments and piers for a swing bridge at the road crossing, building a retaining wall, the extension of the north wings of the guard lock to form the abutments for a swing bridge and the construction of a supply weir.

*Section 27.* About 5,600 feet in length, includes the enlargement of the canal in the Town of Welland, the construction of an aqueduct over the River Welland, repairing the greater part of the present lift-lock, removing the abutments of road bridge.

*Section 28,* in the aggregate about 4,950 feet in length, embraces the widening and deepening of the canal and the construction of piers and abutments for a swing bridge, and the removal of the present swing bridge.

*Section 33,* includes the widening and deepening of the channel for a distance of one mile, the building of side walls and works for drainage. The removal of material on the southern part of section 32, together with the construction of an inverted syphon culvert for the waters of Lyon's Creek.

*Section 34* extends for a distance of nearly one mile, and includes the widening and deepening of the canal, the construction of abutments and piers for a road bridge, building side walls, cutting back ditches and grading towing path.

*Section 35.* About 2350 feet in length, includes the widening and deepening of the present canal, constructing a new entrance lock with extended wings to form bridge piers and abutments, cutting a raceway and building a weir, constructing road bridges and grading towing path and roads.

The following list sets forth the descriptions of the several sections of the work under contract, and the name of the contractor to whom each section has been assigned.

*Section 1,* includes the works for the extension of Port Dalhousie Harbor and for the enlargement of the present waste-weir and the construction of Lock No. 1.

Contractor, Mr. Patrick Larkin.

*Section 2.* About 2,700 feet in length, between Port Dalhousie and St. Catharines through May's Ravine, including the construction of Locks Nos. 2 and 3.

Contractors, Messrs. Denison, Belden & Co.

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*Section 3.* 2,500 feet long, includes formation of Canal locks Nos. 4 and 5, two regulating weirs, two towing path bridges and supply race.

Contractors, Messrs. Denison, Belden & Co.

*Section 4,* embraces 3,250 feet formation of canal, the work for the new line of Welland Railway for a distance of 5,944 feet, and the construction of piers and abutments for two swing bridges for the railway and for the road leading to St. Catharines.

Contractors, Messrs. Blake, Bros. & Campbell.

*Section 5.* 3,200 feet in length: includes construction of Locks Nos. 6 and 7, two regulating weirs, and two towing path bridges.

Contractor, Mr. Alexander Manning.

*Section 6,*—includes 7,000 feet formation of canal, the construction of piers and abutments for swing bridge, Niagara street, St. Catharines, and the abutments and pier for a towing path bridge.

Contractor, Mr. Patrick Shannon.

*Section 7,* extends a distance of 3,075 feet; it includes Locks Nos. 8 and 9, two regulating weirs, two towing-path bridges, and the abutments and piers for swing bridge for road between St. Catharines and Queenston.

Contractors, Messrs. Higgins and Sullivan.

*Sections 8 and 9,* included in one contract, embrace the formation of canal for 6,333 feet, the construction of three locks, Nos. 10, 11, 12, three regulating weirs, four bridges over the openings, between the side basins, and reaches, the construction of abutments and piers for a public road bridge, and a culvert to pass the waters of Ten Mile Creek.

Contractors, Messrs. Cairns, Morse, Hart & Co.

*Section 10.*—2,107 feet long includes construction of Locks Nos. 13 and 14, two regulating weirs, the piers and abutments for the towing-path bridges, forming basins on west side, and grading approaches to bridge seat formed by the extension of the lower wings of Lock No. 13.

Contractors, Messrs. John Ginty & Co.

*Section 11,* extends 2,250 feet, and includes the construction of two locks, Nos. 15 and 16, a regulating weir, two or more towing path bridges and a culvert under the canal for a public road.

Contractor Mr. Paul Ross.

*Section 12,* extends 2,115 feet and includes the channel and basins on the North-Western side, the construction of two locks, Nos. 17 and 18, two regulating weirs and two towing path bridges. It also includes the work for the diversion of the Great Western Railway, including a tunnel under the canal.

Contractors, Messrs. Lobb, Dawson & Murray.



*Section 13.*—2,000 feet in length includes the construction of two locks, Nos. 19 and 20, two regulating weirs, two towing-path bridges, and the formation of basins on the north side of the canal.

Contractors, Messrs. Ginty and Dickey.

*Section 14.*—1,775 feet long includes construction of locks Nos. 21 and 22, two regulating weirs, and three towing path bridges, and the formation of channels and basins on the north side of canal.

Contractor, Mr. John Brown.

*Section 15.*—2,050 feet in length to the east of the town of Thorold, includes the formation of the canal, cutting a supply race, forming a new water course for the creek, and the excavation necessary to move the track of the Welland Railway to the westward, the construction of two locks, Nos. 23 and 24, two weirs, piers and abutments for a road bridge with retaining walls.

Contractor, Mr. John Brown.

*Section 16.*—3,500 feet long, consists chiefly of clay and rock excavation and the construction of a syphon culvert for Ten Mile Creek, with slope and retaining walls.

Contractor, Mr. John Brown.

*Sections 21 and 22.*—One and nine-tenths miles in length, between Allanburgh and Port Robinson and known as the "Deep Cut." They include lowering of the bottom, to three feet below the level of the mitre sill of Port Colborne Lock and an increase of width chiefly on the west side.

Contractors, 1. Messrs. R. Mitchell & Co.

" 2. Mr. John Brown.

*Section 23.*—About one mile in length includes deepening and widening canal and placing a set of guard gates near the north end of the section.

Contractor, Mr. John Carroll.

*Section 24*—One mile in length, consists chiefly in widening and deepening canal.

Contractor, Mr. Charles F. Dunbar.

*Section 25*, embraces widening and deepening canal, &c., for one mile, the construction of piers and abutments of a new bridge for the Quaker Road.

Contractors, Messrs. Ferguson, Mitchell & Symmes.

*Section 26*, consists principally in widening and deepening the canal for a mile.

Contractor, Mr. John Carrol.

*Sections 29, 30, 31 and 32.*—Between the Junction and Ramey's Bend; include three and three quarters miles of widening the canal about fifty feet on the west bank, and lowering the present bottom from two to three feet throughout.

Contractors, Section 29, Messrs. R. Mitchell & Co.

" " 30, " John Ferguson & Co.

" " 31, 32, Mr. John Brown.

Section 36, embraces the improvement of Port Colborne Harbor, the Lake Erie entrance, including the extension of the west pier, about four hundred feet into the Lake and deepening the entrance channel.

Contractor, Mr. Charles F. Dunbar.

The canal is crossed by the Welland Railway and the Great Western Railway.

The Welland Railway will cross by a swing bridge.

A diversion of over a mile of railway has been made to attain this result.

The Great Western Railway will pass under the canal by a tunnel 750 feet in length, situated 1,850 feet to the south of the present crossing to the north-east of Thorold.

The principle of crossing by a swing bridge, both in the interests of the railway and of the canal, was so objectionable that it was decided to pass under the canal.

The line has been diverted to the extent of  $1\frac{1}{2}$  miles to obtain a fit location.

Much progress has been made in dredging Port Dalhousie Harbor. When the work is completed, the basin will extend over 16 acres with a depth from 16 to 17 feet.

Excepting the entrance lock, all the locks under contract with the minor structures are in fair progress, many of them on the eve of completion; most of them will be finished during the present season.

The excavation of the prism of the canal and the formation of the banks on the new line with the several bridge abutments and piers have been efficiently carried on.

The Thorold road culvert is completed and the Great Western Railway tunnel will be finished in the season of 1877.

The work for deepening Port Colborne Harbor has been carried on successfully.

All the work may be described as being in a satisfactory condition, no delay need be anticipated in any part of the work under contract.

#### BURLINGTON BAY CANAL.

Length of canal.....	$\frac{1}{2}$ mile.
No locks on this canal.	
Average breadth between piers.....	138 feet.
Narrowest " " " .....	108 "

This canal is cut through the sand bar which separates Burlington Bay from Lake Ontario, and is navigable for vessels drawing ten feet of water. It gives access to the Port of Hamilton, and to the Town of Dundas via the Desjardins Canal.

This canal closed on 11th December, 1876, and opened 11th April, 1877.

A house for the ferryman has been constructed and some repairs given to the piers.

The Hamilton and North Western Railway Swing Bridge over the canal has been completed and is in regular use.—(Appendix 7, page 39.)

### MONTREAL, OTTAWA AND KINGSTON.

This route extends from the harbor of Montreal to the port of Kingston, passing through the Lachine Canal, the navigable sections of the Lower River Ottawa and the Ottawa Canals, to the City of Ottawa, thence by the River Rideau and Canal navigation to Kingston on Lake Ontario,—a total navigation of  $246\frac{1}{4}$  miles.

After leaving the Lachine Canal, the works constructed to overcome the difficulties of navigation are:—

The St. Anne's Lock;  
 Carillon Canal;  
 Chute à Blondeau Canal;  
 Grenville Canal;  
 Rideau Navigation;

The total lockage is  $533\frac{1}{2}$  feet—( $356\frac{1}{2}$  rise, 177 fall)—and the number of locks 59.

The following table exhibits the intermediate distances from Montreal Harbor.

Sections of Navigation.	Intermediate distance.	Total distance from Montreal.
The Lachine Canal.....	8 $\frac{1}{2}$	.....
From Lachine Canal to St. Anne's Lock.....	15	23 $\frac{1}{2}$
St. Anne's Lock and Piers.....	$\frac{1}{2}$	23 $\frac{3}{4}$
From St. Anne's Lock to Carillon Canal.....	27	50 $\frac{3}{4}$
The Carillon Canal.....	2 $\frac{1}{2}$	52 $\frac{1}{2}$
From the Carillon Canal to Chute à Blondeau.....	4	56 $\frac{1}{2}$
Chute à Blondeau Canal.....	$\frac{1}{2}$	56 $\frac{1}{2}$
From Chute à Blondeau Canal to Grenville Canal.....	1 $\frac{3}{4}$	58 $\frac{1}{2}$
The Grenville Canal.....	5 $\frac{1}{2}$	64
From the Grenville Canal to entrance, Rideau Navigation.....	56	120
Rideau Navigation, ending at Kingston.....	126 $\frac{1}{4}$	246 $\frac{1}{4}$

## ST. ANNE'S LOCK.

Length of canal.....	$\frac{1}{8}$ mile.
Number of locks .....	1
Dimensions of lock.....	190 ft. by 45 ft.
Total rise of lockage.....	3 feet.
Depth of water on sills.....	$\left\{ \begin{array}{l} 6 \text{ feet at low water.} \\ 7 \text{ feet at ordinary high water.} \end{array} \right.$

This work, with guide piers above and below, surmounts the St. Anne's Rapids between Ile Perrot and the head of the Island of Montreal, at the outlet of that portion of the River Ottawa which forms the Lake of Two Mountains,  $23\frac{1}{2}$  miles from Montreal Harbor.

This lock was closed the 29th November, 1876, and opened the 21st April 1877.

The general repairs during the last season were light.

A new channel is being formed 1,200 feet in length by 120 feet wide, 10 feet 6 inches deep at low water, across the shoal below the lock to the deep water channel by Ile Perrot, the sides being formed of continuous crib work.

Some delay was experienced by the high water of 1876.

The work has been continued without interruption and it is anticipated that it will be finished by the end of the season of 1877. Arrangements have been made for dredging the approaches. (Appendix 3, page 18.)

## THE CARILLON CANAL.

Length of canal.....	$2\frac{1}{8}$ miles.
Number of locks.....	3 (two ascending—one descending.)
Dimensions of locks :—Lift Lock, No. 1.....	128 feet x $32\frac{1}{2}$ feet.
do No. 2.....	$126\frac{1}{2}$ " x $32\frac{1}{2}$ "
Guard Lock, No. 3..	$126\frac{1}{2}$ " x $32\frac{1}{2}$ "
Total lockage.....	$34\frac{3}{4}$ " $\left\{ \begin{array}{l} 21\frac{3}{4} \text{ upwards.} \\ 13 \text{ downwards.} \end{array} \right.$
Depth of water on sills.....	6 "
Breadth of canal at bottom.....	30 "
Breadth of canal at water surface.....	50 "

This canal overcomes the Carillon Rapids.

From St. Anne's Lock to the foot of the Carillon Canal, there is a navigable stretch of twenty-seven miles, through the Lake of Two Mountains and the River Ottawa.

It was closed from the 30th November, 1876, to the 26th April, 1877.

The recess wall of Lock No. 2, was rebuilt. The usual repairs have been made.

The maintenance of the North River dams and feeder exacted a large expenditure. It is found difficult to obtain a sufficient supply of water during midsummer. (Appendix 3, page 18.)

#### CHUTE A BLONDEAU CANAL.

Length of canal.....	$\frac{1}{2}$ of a mile.
Number of locks.....	1
Dimensions of lock.....	130 $\frac{1}{2}$ feet x 32 $\frac{1}{2}$ feet at upper end and 36 $\frac{1}{2}$ feet at lower end.
Total rise of lockage.....	3 $\frac{3}{4}$ feet.
Depth of water on sills.....	6 "
Breadth of canal at water surface.....	30 "
Breadth of canal at bottom.....	30 "

Between the Carillon and Chute à Blondeau Canals there is a navigable stretch of four miles. This canal is cut through solid rock, and has only one lock. It is only used by vessels going up the river; all down vessels run the rapids.

Closed 30th November, 1876; opened 26th April, 1877.

The usual repairs have been made.

It is difficult to keep the water in this canal at a sufficiently high level.

#### NEW WORKS.

The new works are situate about  $\frac{3}{4}$  of a mile above the village of Carrillon, and consist of a dam across the river Ottawa, 1800 feet in length, with a timber slide 600 feet long by 12 feet wide. A canal  $\frac{3}{4}$  of a mile long, with 2 locks, 200 feet by 45 feet, with 9 feet of water on the sills is in course of construction on the north bank.

The intent of these works is to replace by an enlarged navigation, the Carillon and Chute à Blondeau Canals. The present Carillon Canal ascends 21.9 by 2 locks, and descends by 1 lock 13 feet. The Chute à Blondeau Canal by 1 lock ascends 3.9—giving a total of 4 locks.

On Lock No. 2, the walls have been carried up to a height of about ten feet. Some progress has been made in the crib-work and earth-work. The rock excavation between the two locks, is nearly completed.

The work at the dam and slides has proceeded but slowly. (Appendix 3, page 19.)

### THE GRENVILLE CANAL.

Length of canal.....	5 $\frac{1}{2}$ miles.
Number of locks.....	7
Dimensions of locks—Lift Lock No. 5 } Combined....	{ 130 $\frac{3}{8}$ feet x 32 $\frac{1}{8}$ feet.
"      "      No. 6 }	{ 128 $\frac{3}{8}$ " x 32 $\frac{1}{8}$ "
"      "      No. 7 }	{ 128 $\frac{1}{8}$ " x 31 $\frac{1}{8}$ "
"      "      No. 8 }	{ 128 " x 32 $\frac{1}{8}$ "
Locks Nos. 9 and 10 and Guard Lock No. 11.....	200 " x 45 "
Total rise of lockage.....	45 $\frac{1}{2}$ "
Depth of water on sills. ....	6 "
Depth of water on sill of Locks Nos. 9, 10 & 11..	9 "
Breadth of canal at bottom.....	20 to 30 feet.
Breadth of canal at surface of water.....	25 to 60 "

From the head of the Chute à Blondeau Canal to the foot of the Grenville Canal there is a navigable reach of 1 $\frac{3}{8}$  miles.

This canal is situated about 56 miles below the City of Ottawa, and avoids the Long Sault Rapids.

Closed 30th November, 1876; opened 1st May, 1877.

The walls of Locks No. 7 and 8 have been repaired. The works of the canal have been generally maintained.

#### NEW WORKS.

The improvement contemplates the enlargement of the canal. The bottom width to be 40 feet, the depth 10 feet with crossing basins.

The new locks to be 200 x 45 feet with 9 feet on the sills.

Locks Nos. 9, 10, 11 of the required dimensions have been completed.

Four crossing basins 600 feet in length have been completed. Located on curves, they have somewhat straightened the line of canal.

Two basins below Lock No. 10 have also been excavated.

Above the guard lock the excavation has only been carried to a depth of 6 feet.

Excavation is still required below the guard lock.

Locks 5, 6, 7, and 8, and the excavation below No. 8 have not been commenced. (Appendix 3, pages 20, 21.)

### CULBUTE CANAL.

This Canal is west of the route between Montreal and Kingston, being 107 miles above the entrance to the Rideau navigation at Ottawa. Above the city of Ottawa, the following rapids are met:—The Chaudière, the Duchêne, the Chats, the Chenaux, —popularly called the “Snows”—the Portage du Fort, and the Grand Calumet.

The Canal is designed to overcome the Culbute and L'Islet Rapids, and is situated in the north channel of the Ottawa. It consists of two combined locks, each 200 feet in length and 45 feet in width, with 6 feet of water on the sills, having a total lift of from 18 to 20 feet. The dams have a total length of 520 feet. It opens a navigable reach of 80 miles between Bryson, at the head of the Grand Calumet Falls, and the foot of Des Joachims Rapids.

These works were completed on the 1st of November, 1876.

The distance between the Culbute Canal and Bryson is 40 miles. During the last dry season the shoals in the Calumet Channel, in this reach, had only three feet of water over them. A project for increasing the depth at these shallow spots is under consideration. (Appendix 3, Page 22.)

### RIDEAU NAVIGATION.

The Rideau navigation connects the River Ottawa at the City of Ottawa, with the eastern end of Lake Ontario, at Kingston.

Length of navigation.....	126½ miles.
Number of locks going from Ottawa to Kingston.	$\left\{ \begin{array}{l} 33 \text{ ascending.} \\ 14 \text{ descending.} \end{array} \right.$
Total lockage.....	$446\frac{1}{2} \text{ feet. } \left\{ \begin{array}{l} 282\frac{1}{2} \text{ rise, and} \\ 16\frac{1}{2} \text{ fall} \end{array} \right. \text{ at high water.}$
Dimensions of locks.....	134 by 33 feet.
Depth of water on sills, 5 feet; navigable depth through the several canals .....	4½ feet.
Breadth of canals at bottom.....	$\left\{ \begin{array}{l} 60 \text{ feet in earth.} \\ 54 \text{ feet in rock.} \end{array} \right.$
“ at surface of water.....	80 feet in earth.

The following table gives the distances of the intermediate stations between the Cities of Ottawa and Kingston :—

Number of Station.	Name of Station.	Distance from Ottawa.	Locks.		Dams.			Length of Artificial Canal at each station in miles.
			No.	Lift at Low Water.	No.	Length.	Height.	
		Miles.		Rise. F. In.		Feet. 230	Feet. 18	
1	Ottawa.....	0	8	82 0	3	1,320	33	4'00
2	Hartwell's.....	4½	2	22 0	.....	100	28	
3	Hogaback.....	5½	2	13 6	1	320	60	
4	Black Rapids.....	9½	1	10 0	1	300	12	0'13
5	Long Island.....	14½	3	27 0	3	850	68	0'13
6	Burritt's.....	40½	1	10 6	1	240	14	1'50
7	Nicholson.....	43½	2	15 2	1	500	9	0'50
8	Clowes.....	44½	1	10 6	1	481	13	0'05
9	Merrickville.....	46½	3	25 0	1	150	6	0'33
10	Maitland.....	55	1	4 9	1	270	8	0'13
11	Edmunds.....	59½	1	10 10	1	343	8	0'06
12	Old Slys.....	60½	2	15 6	1	250	20	0'25
13	Smith's Falls.....	61½	4	33 9	2	600	24	0'13
14	First Rapids, or Poonamalie.....	64	1	7 9	1	260	5	1'25
15	Narrows.....	83½	1	4 0	1	600	9	0'06
Total rise at low water.....				292 3				
				Fall.				
16	Isthmus.....	87½	1	4 0	.....	.....	.....	1'25
17	Chaffey's.....	92	1	12 6	.....	.....	.....	0'13
18	Davis.....	91½	1	9 0	1	300	15	0'06
19	Jones' Falls.....	97½	4	60 0	1	300	60	0'25
20	Brewer's Upper Mills.....	108½	2	19 0	1	200	20	1'75
21	do Lower Mills.....	110	1	14 2	1	200	12	4'25
22	Kingston Mills.....	120½	4	46 8	1	6,042	14	0'25
23	Kingston.....	128½	.....	.....	.....	.....	.....	.....
Total fall at low water.....				165 4				
Total.....			47	.....	24	13,472	.....	16'46



The navigation closed at Kingston Mills 27th November, 1876, and opened 30th April, 1877.

At Ottawa, navigation closed the 7th December 1876, and opened 1st May 1877.

The summit level of the navigation is at upper Lake Rideau. But several of the descending reaches are also supplied by the waters which have been made tributary to them. The following description gives the sources of supply.

On leaving the summit, the route towards Ottawa passes by the River Rideau, and towards Kingston by the River Cataraqui. The whole duty of keeping the navigation to its level, is thrown upon the reserves, given in detail below.

They may be divided into three systems, viz :—

1. The summit level supplied by Lake Wolfe system.
2. The eastern descending level to Ottawa supplied by River Tay system, discharging into Lake Rideau.
3. The south-west descending level to Kingston, supplied by Lake Devil system, discharging into Lake Mud.

Lake Buck system, discharging into Lake Mosquito, and thence into Lakes Mud and Indian.

Lake Rock system, discharging into Lake Openacon.

Lake Loughboro' system, discharging into Lake Openacon.

' Round Tail system, discharging into Lake Cranberry.

The following adjacent waters are totally distinct from the Rideau navigation.

The River Mississippi, which discharges into the River Ottawa, in the Township of Fitzroy.

The River Napaneo, Mill Haven Creek and Lake Collins, which discharge into Lake Ontario.

During the last fiscal year the swing bridges have been restored and the works generally maintained at Kingston Mills, Smith's Falls, Merrickville, and Nicholson's.

Gates have been maintained and general repairs performed at Jones' Falls, and Hartwell's.

The dams have been strengthened and general repairs executed at Kingston Mills, White Fish, Black Rapids, and Hartwell's.

The bridge was restored and general repairs attended to at Davis's.

The locks have been repaired at Davis's, Newboro, and Ottawa.

New bridges were constructed at Brewer's Lower Mills, and Jones' Falls.

The bulkhead was rebuilt and general repairs made at Hogsback.

The buildings were restored and repairs generally made at Kingston Mills.

On the 26th August the dam at Mud Lake was torn down. (Appendix 8, page 40.)

**TABLE showing the dimensions of the locks on the present canals in the Montreal, Ottawa and Kingston line of navigation ; also the size of the largest vessel which may pass through them.**

Name of Canal.	Dimensions of Locks.			Dimensions of Vessels.			
	Length.	Breadth.	Depth of Water	Length.	Breadth.	Draught of water when loaded.	Tonnage.
Carillon and Grenville...	128	31½	5½	110	28	5	100
Rideau .....	134	32	5	110	31½	4½	250

### RICHELIEU AND LAKE CHAMPLAIN.

This navigation, commencing at Sorel, at the confluence of the Rivers St. Lawrence and Richelieu, forty-six miles below Montreal, and one hundred and fourteen miles above Quebec, continues along the River Richelieu through the St. Ours' Lock to the Basin of Chambly, where it takes the Chambly Canal to St. John's and again follows the River Richelieu to Lake Champlain, of which the Richelieu is an outlet. The distance from Sorel to the Boundary Line is 81 miles.

At Whitehall, the southern end of Lake Champlain, the Champlain Canal is entered, and a connection obtained with the River Hudson, by which the City of New York is directly reached. The distance three hundred and thirty miles is in the Territory of the United States.

The following table shows the distances between Sorel and New York :

Sections of Navigation.	Intermediate distance in Miles.	Total Distance.
Sorel to St. Ours' Lock .....		14
St. Ours' Lock to Chambly Canal .....	32	46
Chambly Canal .....	12	58
Chambly Canal to Province Line .....	23	81
Boundary Line to Champlain Canal .....	111	192
Champlain Canal to Junction with Erie Canal .....	66	256
Erie Canal from Junction to Albany .....	7	263
Albany to New York .....	146	411

### ST. OURS' LOCK AND DAM.

Length of canal.....	$\frac{1}{2}$ mile.
Number of locks.....	1
Dimensions of lock.....	200 feet by 45 feet.
Total rise of lockage.....	5 feet.
Depth of water on sills.....	7 feet at low water.
Length of dam in Eastern Channel.....	300 feet.
“ “ Western Channel.....	600 feet.

At St. Ours', fourteen miles from Sorel, the River Richelieu is divided by a small island into two channels. The St. Ours' Lock is in the eastern channel.

There is a navigable depth of 7 feet between St. Ours' Lock and Chambly Basin, a distance of thirty-two miles.

Closed 30th November, 1876; opened 10th April, 1877.

Navigation was interrupted for a total of  $25\frac{1}{2}$  hours on the 10th, 11th and 17th of April, 1877.

The guide piers and dam have been repaired; the valves of the lock gates adjusted; superintendent's house and fencing repaired. (Appendix 3, page 18.)

### RIVER RICHELIEU.

The channel 100 feet wide, between St. Ours' and Belœil has been cleaned out to its depth of 7 feet. Further dredging is required at St. Antoine which, it is anticipated, will be completed at the close of the season of 1877. (Appendix 3, page 17.)

### CHAMBLY CANAL.

Length of canal....	12 miles.
Number of locks.....	9
Dimensions of locks —	
Guard Lock, No. 1, at St. John's.....	122 feet by $23\frac{1}{2}$ feet.
Lift “ No. 2.....	124 “ $23\frac{7}{12}$ “
“ “ Nos. 3, 4, 5, 6 .....	118 “ 23 to $23\frac{7}{12}$ feet.
“ “ Nos. 7, 8, 9 combined.....	125 “ $23\frac{3}{4}$ feet.
Total rise of lockage.....	74 “
Depth of water on sills.....	7 “
Breadth of canal at bottom.....	36 “
“ “ surface of water.....	60 “

Succeeding the thirty-two miles of navigation between St. Ours' Lock and Chambly Basin—a natural reservoir formed by the expansion of the River Richelieu—is the Chambly Canal, which overcomes the rapids between Chambly and St. John's, a distance of 12 miles.

This canal was closed 28th November, 1876, and opened 1st May, 1877.

Navigation was uninterrupted.

The works have generally been maintained.

Additions were made to houses at Locks Nos. 7 and 8. The by-wash between Locks Nos. 4 and 5 was rebuilt. The west wing wall of Bridge No. 3 was rebuilt with timber. (Appendix 3, page 17.)

TABLE showing the sizes of the smallest locks on the canals of the Richelieu and Lake Champlain line of navigation to New York, also the dimensions of the largest vessel which may pass through them.

Name of canal.	Dimensions of Lock in feet.			Dimensions of Vessel in feet.			
	Length.	Breadth.	Depth of water on sills.	Length.	Breadth.	Draught of water when loaded.	Tonnage
U. S.—Erie Canal.....	110	18	7	102	17½	6	210
U. S.—Champlain Canal.....	97	14	4	89	13½	3½	70
Chambly Canal.....	118	23½	7	114	23	6½	230

### ST. PETER'S CANAL.

Length of canal, about 2,400 feet.

Breadth of canal at bottom, 26 feet.

One tidal lock, 4 pair of gates.

Dimensions, 26 by 122 feet.

Depth of water on sills, 13 feet at lowest water.

Extreme rise and fall of tide in St. Peter's Bay, about 9 feet.

This work connects St. Peter's Bay, on the southern coast of Cape Breton, Nova Scotia with the Bras d'Or Lakes. It crosses an isthmus half a mile long, and gives access to the Atlantic Ocean.

Since June 1876 it has been closed to admit of the progress of the work.

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This canal is to be widened to 48 feet at bottom with a depth of 15 feet below summer level of the Bras d'Or, with a tidal lock 200x48 feet with wharves and piers.

The works will include the erection of a Lock-master's house and a swing bridge.

At the close of the Fiscal year, about one quarter of the work under contract had been performed.

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## WORKS ON NAVIGABLE RIVERS.

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### DOMINION RIVERS.

The following rivers are under the control of the Dominion Government :—

The St. Lawrence (to the head of Lake Superior.)

- " Ottawa.
- " St. Croix, New Brunswick.
- " Restigouche, do
- " St. John, do
- " Tidnish, Nova Scotia.
- " Missiguash, boundary line between New Brunswick and Nova Scotia.
- " Fraser, British Columbia.
- " Red, Manitoba.

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## RIVER ST. LAWRENCE.

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### HARBOR OF QUEBEC GRAVING DOCK.

By the Act 38 Vict., Chap. 56, the Quebec Harbor Commissioners were authorized to borrow an amount which, with the sums voted by the Parliament of Canada, or granted by the Imperial Government, will be sufficient to construct a Graving Dock in the Harbor of Quebec.

In conformity with the advertisement of the Harbor Commissioners, competition designs were sent in for the work, and in June, 1875, the Commissioners awarded the 1st prize to Messrs. Kinipple & Morris.

By clause 3 of the above cited Act, the site of the location, the plans, specifications and contract must obtain the approval of the Governor in Council.

After a survey by the Department of the sites named as offering advantages for the location, an Order in Council, dated 26th May, 1877, has established Point Lévis as the site for the work.

#### REMOVAL OF ANCHORS AND CHAINS HARBOR OF QUEBEC.

Owing to the serious obstructions to navigation in the Harbor of Quebec, arising from sunken anchors and chains, an Order in Council was passed on the 16th August, 1876, authorising the removal of such obstructions by the Lifting Barge, and that when obtained the property recovered could be sold by auction and the proceeds applied to the expenditure of the improvement. The work has been commenced, the operations having been attended with success.

The total sales since the commencement of the work up to the 31st December, 1877, for anchors and chains amount to \$2,601.51.

#### DEEPENING CHANNEL BETWEEN QUEBEC AND MONTREAL.

The design is to increase the depth of 20 feet attained in 1865, to 22 feet at lowest water, the channel having a width of 300 feet. This work is being carried on by the Harbor Commissioners of Montreal and is reported as proceeding satisfactorily. (Appendix 23 page 197.)

#### CHAIN TUG SERVICE.

A chain tug 112 feet long, 27 feet beam, and  $7\frac{1}{2}$  feet hold, has been constructed for the purpose of examining the rapids of the St. Lawrence, and hereafter to be used for drilling in the work of deepening the channel of the Galops. Likewise with the design of testing a system of submerged chain towing.

The engines, high-pressure and condensing, have two cylinders of twenty-two inches diameter, and five feet stroke. The links of the chain are  $1\frac{1}{2}$  inch iron, tested to a tensile strain of 21 tons. The breaking strain was found to be from  $44\frac{1}{2}$  to 46 tons.

The vessel arrived at the Galops Rapids on the 23rd August, 1876, and was placed on the line of chain and in the berth prepared for her. It was found practicable to anchor her at the strongest part of the current, in 15 or 16 feet of water, to use the steam drills, and effectively to control the movement of the vessel.

#### NEEBISH RAPIDS.

The Neebish Rapids are situated at the foot of Lake George, half way between Bruce Mines and Sault St. Mary, and extend over a length of 1,600 feet.

The design is to obtain a depth of 14 feet 6 inches on a width of 200 feet. The works were carried on last season and are in progress. Many of the obstructions have now been removed. (Appendix 13, page 60.)

## HARBORS AND PIERS.

### ATLANTIC COAST.

#### SAINT JOHN.

The breakwater is on the eve of completion. (Appendix 14, page 63.)

#### RIVER SALMON,

In Queen's County, N. B., flowing into Grand Lake.

Board's Bar, has been reduced by dredging. (Appendix 14, page 65.)

#### RIVER ST. JOHN.

The Oromocto Shoals were dredged to the extent of one mile.

The deep water terminus at Saint John has been deepened. (Appendix 14, page 65.)

#### CHIPMAN BROOK.

Situated on southern shore, Minas Channel, Bay of Fundy, 60 miles east of Digby Gut.

An addition of 60 feet has been made to the breakwater. (Appendix 14, page 64.)

#### YARMOUTH.

In Yarmouth County N.S., 205 miles south-west of Halifax.

The harbor has received some dredging. (Appendix 14, page 65.)

#### LUNENBURG.

In Lunenburg County, N. S., 68 miles W.S.W. of Halifax.

The harbor has been dredged. (Appendix 14, page 65.)

#### LIVERPOOL.

In Queen's County, N.S., on River Mersey, 108 miles S.W. of Halifax.

The bar at the entrance has been renewed by dredging. (Appendix 14, page 65.)

#### MUSQUODOBOIT.

On the south east coast, about 28 miles north east of Halifax. Several boulders were removed from the bar at the entrance. (Appendix 14, page 65.)

#### L'ARDOISE..

On east side of St Peter's Bay, about 9 miles south east from the entrance to St. Peter's Canal.

A breakwater 400 feet in length has been completed. (Appendix 14, page 63.)

#### COW BAY.

About 30 miles south east of Sydney, Cape Breton.

The breakwater has been repaired.

Further repairs are in progress. (Appendix 14, page 64.)

## LINGAN BEACH.

At the head of Indian Bay, north east coast of Cape Breton, 12 miles south east from entrance to Sydney Harbor.

The breaches in the beach separating Bridgeport Basin from Indian Bay have been protected by brush work. (Appendix 14, page 65.)

## INGONISH.

On the Gulf of St. Lawrence, about 20 miles south of North Cape, Cape Breton. The works were brought to a close last November. (Appendix 14, page 63.)

## CHETICAMP.

In Inverness County, Cape Breton.

The bar at the entrance was removed by dredging. (Appendix 14, page 65.)

## MABOU.

On the north shore of Cape Breton, Inverness County.

This pier has been repaired.

## PORT HOOD.

Inverness County, Cape Breton.

This work has received some repairs.

## BIG TRACADIE.

On the southern shore of St. George's Bay, about 10 miles to the westward of the northern entrance to the Strait of Canso.

Some repairs were executed. (Appendix 14, page 65.)

## HARBOR AU BOUCHÉ.

In Restigouche County, N. S., on St. George's Bay, 30 miles from Antigonish.

The entrance to the harbor was widened. (Appendix 14, page 65.)

## PICTOU.

In Pictou County, N.S., on the straits of Northumberland, and 113 miles north-east of Halifax.

Dredging was executed at the Intercolonial Railway wharf.

The East River was also deepened. (Appendix 14, page 65.)

## RICHIBUCTO.

On the Straits of Northumberland, 40 miles north of Shediac.

Brush protection has been placed to the west of the head of the breakwater.

The bar at the entrance of the harbor has been dredged. (Appendix 14, page 64.)

## RIVER MIRAMICHI,

Emptying into Miramichi Bay, N. B.

The "Horse Shoe Shoal," at its mouth, has been dredged. (Appendix 14, page 65.)



## SHIPPEGAN.

In the County of Gloucester, at the entrance of Bay of Chaleurs, 70 miles from Chatham.

The works brought to a close last season have not been resumed at the close of the fiscal year. (Appendix 14, page 63.)

## GRANDE ANSE.

In Gloucester County, on north shore of Bay of Chaleurs, about midway between Shippegan Sound and Bathurst Harbor.

The work injured by a north-west gale has been restored. (Appendix 14, page 64.)

## COLVILLE BAY.

King's County, P. E. I., leading to Souris, north east terminus of the Railway. The extension of the breakwater has been completed. (Appendix 14, page 64.)

## NEW LONDON.

In Queen's County, P.E.I., about the centre of the Island.

Repairs have been made to the pier at this place.

## TIGNISH.

Near the northern extremity of Prince Edward Island.

The repairs and increase of height in the breakwater have been completed. (Appendix 14, page 64.)

## SURVEYS.

Several harbors on the Atlantic coast have been surveyed. (Appendix 14, page 67.)

## RIVER ST. LAWRENCE.

## MATANE.

Matane lies on the south shore 240 miles below Quebec. A survey of the basin and river mouth has been ordered. (Appendix 13, page 51.)

## RIVER BLANCHE.

This river is situated between the Rivers Tartigoux and Matane, about 26 miles east of the River Métis.

The mooring crib has been completed. (Appendix 13, page 51.)

## TROIS PISTOLES.

185 miles below Quebec, on the south shore.

A survey and examination has been made to determine the best site for a pier, and the cost of construction. (Appendix 13, page 51.)

## RIVER DU LOUP (EN BAS.)

On the south shore of the St. Lawrence, 108 miles below Quebec.

This pier has been restored. (Appendix 13, page 52.)

## RIVER OUELLE.

On the south shore of the St. Lawrence, 75 miles below Quebec.

This pier has been restored. (Appendix 13, page 52.)

## ST. JEAN PORT JOLI.

55½ Miles below Quebec, on the south shore of the St. Lawrence.

Arrangements have been made for the expenditure of the \$2,000 voted by Parliament in connection with the work performed by the municipality. The whole will be completed in the fall of 1877. (Appendix 13, page 52.)

## L'ISLET.

On the south shore of the St. Lawrence, 47 miles below Quebec.

The work of the restoration of this pier was carried on last season and will be continued during 1877. (Appendix 13, page 53.)

## BERTHIER (EN BAS.)

On the south shore of the St. Lawrence, 24 miles below Quebec.

The work towards the restoration of this pier is in progress and will be completed in the fall of 1877. (Appendix 13, page 53.)

## BAY OF QUINTE.

## BELLEVILLE.

48 miles from Kingston. Additional dredging has been commenced on the eastern side of the Harbor. (Appendix 13, page 53.)

## TRENTON.

At the head of the Bay of Quinte, 60 miles from Kingston and 12 miles above Belleville. It is an important shipping place.

Arrangements have been made for dredging the entrance to the Harbor. The work will be completed in the fall of 1877. (Appendix 13, page 54.)

## LAKE ONTARIO.

## COBOURG.

Is situated on Lake Ontario, 72 miles east of Toronto. The improvement is the construction of a pier 1,470 feet long, 30 feet wide, carried out on the line of Hibernia street; two thirds of the cost to be borne by the Department, and one third by the Harbor Commissioners of Cobourg.

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This work was completed at the end of September, 1876. The work of bringing up the superstructure of the outer cribs to a level is now in progress. (Appendix 13, page 54.)

**PORT HOPE.**

Port Hope is situated 7 miles to the west of Cobourg, on Lake Ontario.

The piers finished in September, 1875, having sunk from the yielding nature of the foundation, were brought up to a level the following season.

**NEWCASTLE.**

47 miles east of Toronto. Arrangements have been made for dredging the harbor. The work will be completed in the fall of 1877. (Appendix 13, page 54.)

**TORONTO.**

The work of deepening the western entrance is now in progress. (Appendix 13, page 54.)

**OAKVILLE.**

Is 19 miles west of Toronto on Lake Ontario. This harbor has been surveyed. (Appendix 13, page 55.)

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**LAKE ERIE.**

**PORT BURWELL.**

Is situated between Rondeau and Long Point, being distant from the former 62 and from the latter 22 miles.

The harbor has been dredged, the shoal at the entrance removed and the superstructure partially restored. (Appendix 13, page 56.)

**PORT STANLEY.**

Is about 85 miles from the entrance to the Welland Canal, 112 miles from Erie, and 85 miles from Cleveland, State of Ohio.

A survey has been ordered to determine the condition of the harbor. (Appendix 13, page 57.)

**RONDEAU.**

At Point Aux Pins, 140 miles above Port Colborne. Instructions have been given for an examination of the openings at the entrance. (Appendix 13, page 57.)

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**LAKE ST. CLAIR.**

**RIVER SYDENHAM, NORTH BRANCH.**

This branch extends from Wallaceburg to Wilkesport, a distance of 15½ miles by the River and 12 by the road.

The River from Cranston's Bend to Wilkesport has been surveyed.

In order to obtain 8 feet of water, dredging will be necessary on 23 shoals lying in extent from 130 to 2,670 feet. (Appendix 13, page 57.)

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## LAKE HURON.

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### BAYFIELD.

Is situated on Lake Huron, 12 miles south of Goderich, in the Township of Stanley.

This work was completed in May last. The harbor has been dredged to a depth of 10 feet. Additional protection has been ordered for the south pier. (Appendix 13, page 57.)

### GODERICH.

Situate at the mouth of the River Maitland, on the east coast of Lake Huron 68 miles from Sarnia. It is also the terminus of the Buffalo Branch of the Grand Trunk Railway.

The northern breakwater, nearly half a mile in length, has been designed to turn the current of the River Maitland from passing between the two extreme piers, so that the harbor will be entirely relieved from the influence of freshets in the River Maitland.

The spit of sand to the north of the harbor proper has been cut through to admit of the passage of the descending stream.

The work has been completed.

### KINCARDINE.

Is situated at the mouth of the River Penetangore, 31 miles north of Goderich on Lake Huron.

Arrangements have been made to replace the damaged pile work by new cribbing. The cribs will be sunk during the fall of 1877. The dredging required to remove the wash from the storms of last autumn is now in progress. (Appendix 13, page 58.)

### CHANTRY ISLAND.

Chantry Island is situated at the mouth of the River Saugeen, on the east of Lake Huron, about 133 miles above the foot of the Lake at Sarnia.

The work consists of a breakwater carried from the northern point of the Island 1,600 feet easterly on a slightly curved line, with a stone talus on each side.

A beacon, an octangular structure of timber 50 feet across, carried up 40 feet above water line, has been placed in 16 feet of water on the extreme point of the shoal running south-west from the Island, "the South Shoal," with a distinguishing drum.

A breakwater from the main shore, 2,000 in length on a curved line has been constructed to within 400 feet of the end of the pier taken out from the island.

A landing pier has been constructed within the harbor from the main shore.

The works have been completed.

## GEORGIAN BAY.

### OWEN SOUND.

The harbor has been dredged and a winding basin formed. (Appendix 13, page 59.)

### KIPPEL PIER, COLPOY'S BAY.

On Lot 38, Colpoy's Range, a wharf has been constructed to which the Department has contributed. (Appendix 13, page 59.)

### PARRY SOUND.

A survey has been made to determine the cost of removing obstructions found in the channel through the islands. (Appendix 13, page 59.)

## LAKE SUPERIOR.

### PRINCE ARTHUR'S LANDING, THUNDER BAY.

A survey has been ordered to determine the capabilities of this locality for a harbor. (Appendix 13, page 61.)

### RIVER KAMINISTIGUIA.

This River has been surveyed to the Pacific Railway station. Arrangements are in progress to attain a depth of 13 feet through the shoal at the River's mouth and the shallow spots in the stream. It is anticipated that vessels requiring this depth will be able to reach the dock by September, 1877. (Appendix 13, page 61.)

## DREDGES.

The dredges, the property of the Department, are as follows:

### ON THE ATLANTIC COAST.

#### *Elevator Dredges.*

"Canada."

"Saint Lawrence."

#### *Dipper Dredges.*

"New Dominion," with 11 scows.

"Cape Breton," with 7 scows.

"Prince Edward," with 4 scows.

### SAINT LAWRENCE CANALS.

#### *Dipper Dredges.*

"Queen of Canada," with 2 scows.

"No. 1," with 2 scows.

### ON THE LAKES.

#### *Dipper Dredge.*

One dredge, tug and 3 scows.

### BRITISH COLUMBIA.

#### *Dipper Dredge.*

One Dredge

## SLIDES AND BOOMS.

The Government slides were constructed to effect the passage of timber, where impediments to navigation exist, and where no canal connects the reaches of natural navigation. The booms form artificially closed bays at the entrance and discharge of the slide, to retain the timber.

The lumbering districts on which Government works have been constructed are situated on the Saguenay, St. Maurice, Ottawa, Trent, Georgian Bay, and their tributaries.

### RIVER SAGUENAY.

The works on this river consist of one slide 5,840 feet in length, with a boom of 1,314 feet, and dams, piers and bulkhead. The slide takes the timber past the rapids between Lake St. John and the River Saguenay.

The works extend over a distance of about six miles, and are constructed on *La Petite Décharge*, the less of the two affluents of Lake St. John. Commenced in 1856, they were completed in 1860.

The spring freshets caused much damage.

The dam at the mouth of Lake St. John, a portion of the boom, 1,800 feet of slide and the sluices were carried away.

The other works have been maintained.

The portion of the slide carried away in 1876, was repaired by Messrs. Price Bros. (Appendix 12, page 50.)

### RIVER ST. MAURICE.

The slides and booms on this river and the Vermillion, one of its tributaries are met in the order here given.

#### STATIONS.

#### FROM THREE RIVERS.

#### *River St. Maurice:—*

Booms at mouth.....	0 miles.
Grés Falls.....	16 "
Shawenigan.....	20 "
Grand'Mère.....	29 "
Little Piles.....	31½ "
La Tuque.....	100 "
Plamondon Eddy.....	106 "

#### *River Vermillion:—*

Mouth of river.....	116 "
Iroquois Falls.....	121 "

The principal tributaries of the River St. Maurice are the Shawenigan, Mekinak, Matawan, Petit Bostonais, Grand Bostonais, Croche, Vermillion, Tranche, Grand Pierriche and Manouan.

#### BOOMS AT MOUTH.

The booms and piers have been repaired and five piers heightened. An additional pier has been built with some piling.

#### SHAWENIGAN.

The wharf has been filled with additional stone. An additional pier has been built.

#### GRAND'MÈRE.

The booms have been repaired and guy chains obtained.

#### LA TUQUE.

Boom master's house repaired and new piers constructed.

#### IROQUOIS FALLS.

The old dam has been removed and two dams built at the island at upper entrance of channel. (Appendix 11, page 48.)

### THE OTTAWA DISTRICT.

The Government works for the descent of timber in the Ottawa district are as follows :

On the Ottawa, main river.....	11 stations.
“ Gatineau.....	1 “
“ Madawaska .....	15 “
“ Coulonge .....	2 “
“ Black .....	1 “
“ Petewawa.....	31 “
“ River du Moine.....	12 “

The following is a table of distances from St. Anne's Lock at the outlet of the River Ottawa to the mouth of its principal tributaries ; also to the stations where slides or other works have been constructed :

PLACES.	DISTANCE FROM ST. ANNE.
Carillon.....	27 miles.
Grenville .....	40 “
River Nation.....	63 “
River Lièvre.....	79 “
“ Gatineau.....	96 “
Chaudière Falls.....	98 “
Little Chaudière.....	100 “

PLACES.	DISTANCE FROM ST. ANNE.	
Remous.....	102	"
Lac Deschênes.....	105	"
River Quio.....	129	"
Chats Station.....	131	"
Head of Chats.....	134	"
River Mississippi.....	134	"
"    Madawaska.....	136	"
"    Bonnechère.....	148	"
Les Chenaux.....	152	"
Portage du Fort.....	156	"
Mountain Station.....	161	"
Calumet.....	163	"
River Coulonge.....	184	"
"    Black .....	193	"
"    Snake.....	204	"
"    Petewawa .....	218	"
Les Joachims.....	236	"
River du Moine.....	244	"
Rocher Capitaine.....	253	"
Deux Rivières.....	266	"
River Matawan.....	286	"
"    Antoine .....	293	"
"    Beauchêne.....	315	"
"    Porc-épic .....	326	"
"    Grand Opemiconne.....	333	"
"    Keepawa.....	349	"
"    Montreal .....	355	"
Fort Temiscamingue.....	367	"
River Ottetail.....	384	"
"    Blanche.....	386	"
"    des Quinze.....	389	"

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## RIVER OTTAWA.

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### LIST OF SLIDE AND BOOM STATIONS ON THE RIVER OTTAWA.

The distances given are measured on the latest maps, following the channel by which lumber is floated down the river.



Names of stations.	Distance from mouth of Ottawa at St. Anne.
1. Carillon.....	27 miles.
2. Chaudière.... { north side, Hull, } { south side, Ottawa, }	98 "
3. Chaudière (Little).....	100 "
4. Remous.....	102 "
5. Deschênes Rapids .....	104 $\frac{3}{4}$ "
6. Chats Station.....	131 "
7. Head of Chats.....	134 "
8. Chenaux .....	152 "
9. Portage du Fort.....	156 "
10. Mountain .....	161 "
11. Calumet. ....	163 "
12. Joachim Rapids.....	249 "

The works of these twelve stations consist of:—

2,000	lineal feet of canal.
3,835	" slides.
29,855	" booms.
8,656	" dams.
346	" bulkheads.
1,981	" bridges.
52	piers.
3	slide-keeper's houses.
3	store-houses.

The timber was satisfactorily passed through the several slides.

Repairs were made at :

The Joachim	Station.
Calumet	"
Mountain	"
Chenaux	"
Chats	"
North Chaudière	"
South Chaudière	"
Sault au Recollet	"

Some damage was caused to the several works by the extraordinary height of the spring flood. (Appendix 10, page 47.)

## RIVER GATINEAU.

The River Gatineau flows from the north, and discharges into the Ottawa at a point about 96 miles above the junction of that river with the Saint Lawrence and 2 miles below the City of Ottawa. The length of the Gatineau is 400 miles, and it drains an area of about 9,000 square miles.

The Government works are centred at one station, about a mile from its confluence with the Ottawa.

They consist of:—

- 3,071 lineal feet of canal,
- 4,138   "   "   booms,
- 52   "   "   bridge,
- 10 piers,
- 1 slide-keeper's house.

The works have been maintained in the usual manner. (Appendix 10, page 47.)

## RIVER MADAWASKA.

The length of the River Madawaska is 240 miles. It drains an area to the south of about 4,100 square miles, and discharges into the River Ottawa 136 miles above St. Anne.

Slide and boom stations on the Madawaska, numbered from the mouth of the river upwards, are as follows:—

- |                     |                      |
|---------------------|----------------------|
| 1. Mouth of River.  | 9. High Falls.       |
| 2. Arnprior.        | 10. Ragged Chute.    |
| 3. Flat Rapids.     | 11. Boniface Rapids. |
| 4. Balmer's Island. | 12. Duck's Island.   |
| 5. Burnstown.       | 13. Bailey's Chute.  |
| 6. Long Rapids.     | 14. Chain Rapids.    |
| 7. Springtown.      | 15. Opeongo Creek.   |
| 8. Calabogie Lake.  |                      |

The works at these stations consist of:—

- 1,750 lineal feet of slides,
- 18,179   "   booms,
- 4,080   "   dams,
- 182   "   bridges,
- 43 piers,
- 1 slide-keeper's house,
- 1 work shop.

The works have been repaired. (Appendix 10, page 47.)

### RIVER COULONGE.

- The river drains an area of about 1,800 square miles, and its length is 160 miles.  
 • It discharges into the River Ottawa, 184 miles above St. Anne, on the north shore.

The following is a list of the Government works on this river:

Boom at mouth.....	300 feet long, and 1 support pier.
Booms at Romain's Rafting-ground.....	400        "        3        "        piers.
Booms at head of High Falls slide.....	1,848        "        6        "        "
The works have been repaired. (Appendix 10, page 47.)	

### BLACK RIVER.

This river empties into the Ottawa at a point 193 miles above St. Anne. Its length is 128 miles, and the area to the north drained by it is about 1,120 square miles.

The works consist of:—

- 1,139 lineal feet of single-stick booms,
- 873        "        slide,
- 346 lineal feet of glance pier,
- 135        "        flat dam.

The works have been maintained. (Appendix 10, page 47.)

### RIVER PETEWAWA.

The length of the Petewawa is about 138 miles, and the area of the territory drained by it covers about 2,200 square miles.

It flows from the south, and discharges into the Ottawa 218 miles above St. Anne. Seven miles from its mouth, the Petewawa separates into two branches. On these 7 miles there are five stations, on the north branch eighteen stations and on the south branch eight stations.

List of the slides and booms on this river, in the order in which they occur from the mouth upwards:—

- |                        |                 |
|------------------------|-----------------|
| 1. Mouth of the River. | 4. Third Chute. |
| 2. First Chute.        | 5. Bois dur.    |
| 3. Second Chute.       |                 |

## NORTH BRANCH.

- |  |                            |
|--|----------------------------|
| 1. Half-mile Rapid                       | 11. Devil's Chute.         |
| 2. Crooked Chute.                        | 12. Elbow of Rapids.       |
| 3. Between High Falls and Lake Traverse  | 13. Foot of Long Sault.    |
| (a slide and a series of dams and booms) | 14. Middle of Long Sault.  |
| 4. Thompson's Rapids.                    | 15. Head of Long Sault.    |
| 5. Sawyer's Rapids.                      | 16. Between Long Sault and |
| 6. Meno Rapids.                          | Cedar Lake (south shore.)  |
| 7. Below Trout Lake.                     | 17. Between Long Sault and |
| 8. Strong Eddy.                          | Cedar Lake (north shore.)  |
| 9. Cedar Islands.                        | 18. Cedar Lake             |
| 10. Foot of Devil's Chute.               |                            |

## SOUTH BRANCH.

- |                  |                   |
|------------------|-------------------|
| 1. First slide   | 5. Fifth slide.   |
| 2. Second slide. | 6. Sixth slide.   |
| 3. Third slide.  | 7. Seventh slide. |
| 4. Fourth slide. | 8. Eighth slide.  |

The works at these 31 stations are as follows:—

## ON THE MAIN RIVER.

2,963 lineal feet of slides,  
 8,469 " booms,  
 2,077 " dams,  
 7 piers.

## ON THE NORTH BRANCH.

480 lineal feet of slides.  
 2,671 " booms,  
 1,131 " dams,  
 23 piers.

## ON THE SOUTH BRANCH.

2,134 lineal feet of slides.  
 388 " dams.

The works have been maintained. (Appendix 10, page 47.)

## RIVER DU MOINE.

The length of this river is 120 miles, and it drains to the north an area of about 1,600 square miles. It flows into the river Ottawa at a point about 256 miles above St. Anne.

The present works on this river consist of a pier and retaining boom at its mouth, a single-stick slide, and a series of flat dams from the mouth upward. They may be detailed as follows, viz :--

300	lineal feet of slide,
800	“ booms,
1,324	“ dams,
6	piers.

The boom chain was broken through accidentally. (Appendix 10, page 47.)

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### RIVER TRENT AND NEWCASTLE DISTRICT.

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The Trent navigation extends from Trenton on the Bay of Quinté to Fenelon Falls at the north extremity of Sturgeon Lake in the one direction, and following to the south-west on the opposite route passes by the River Scugog into the Lake of that name and continues to Port Perry at the head of the Lake. The distance between the mouth of the Trent and Lindsay on the River Scugog is  $161\frac{1}{2}$  miles. Of this distance  $34\frac{3}{4}$  miles is not navigable for vessels drawing 5 feet of water. The distance from Lindsay to Port Perry at the head of Lake Scugog is 28 miles.

From the mouth of the Trent to Nine Mile Rapids, a distance of 9 miles, there is no navigation. The dam previously placed there in 1844 is now decayed and useless.

From] Nine Mile Rapids to Myersburgh, formerly known as Percy's Landing, there is a distance of  $19\frac{1}{2}$  miles with 5 feet of water. A broken navigation for  $14\frac{1}{4}$  miles succeeds to Heeley's Falls. A reach of navigation 5 feet deep follows by the River Trent and Rice Lake ascending the River Otonabee to Peterboro, a distance of  $51\frac{3}{4}$  miles. The navigation is broken from Peterboro to Lakefield, a distance of  $9\frac{1}{2}$  miles. A reach of navigation is obtained through Clear Lake to Burleigh, a distance of 12 miles, where the Burleigh Rapids extending over a distance of 1 mile are met. An open navigation is then taken to Buckhorn Rapids for 7 miles, at which point the navigation is broken for 1 mile.

The navigation from this point is open to Lake Buckhorn and Lake Chemong to Bridgenorth : to Lake Buckhorn, Lake Pigeon and Lake Ball to Bobcaygeon, thence by Lake Sturgeon and the River Fenelon to Fenelon Falls : and by the River Scugog to Lindsay and thence by Lake Scugog to Port Perry.

The following table gives the distance of navigable and unnavigable reaches:

Navigable. Unnavigable.

From Trenton, Bay of Quinte, to Nine Mile Rapids....		9
" Nine Mile Rapids to Percy Landing.....	19½	
" Percy Landing to Heeley's Falls Dam.....		14½
" Heeley's Falls Dam to Peterboro'.....	51½	
" Peterboro to Lakefield.....		9½
" Lakefield to Burleigh.....	12	
Burleigh Rapids.....		1
" Burleigh Rapids to Buckhorn Rapids.....	7	
Buckhorn Rapids.....		1
" Buckhorn Dam to Lindsay.....	36½	
	126½	34½
" Lindsay to Port Perry at the Head of Lake Scugog	28½	
	155½	34½

Total distance Bay of Quinte to Port Perry. 190 miles.

Passing to Fenelon Falls the distance from Buckhorn

Dam to Fenelon is..... 31½ miles.

The following works are now in operation :

*Chisholm's Rapids.*

Distance from  
Trenton in miles.

The Lock at present is unfit for use but with moderate expenditure could be placed in operation. Owing to the Lock being in this condition the navigation at this point is interrupted..... 15

*Percy Landing.*

There is a retaining boom for saw logs now used..... 28½

*Campbellford.*

The guide booms are in use..... 34½

*Middle Falls.*

The works consist of 4 dams and 2 slides which are effective for the passage of timber..... 37½

*Crow Bay.*

The retaining boom is used for logs..... 38

*Heeley's Falls.*

A dam and 1 slide are in operation here..... 42½

*Cook's Rapids, Hastings.*Distance from  
Trenton in miles.

The works which consist of 1 lock, 1 dam and slide for timber  
are effective..... 34½

*Whitlaw's Rapids.*

Below Peterboro. The lock, dam and canal are in operation. 92½

*Little Lake.*

Three piers and 1 boom which are effective..... 94

*Buckhorn Rapids.*

This dam is important in keeping to a high level the water  
of the lakes west of it as far as Bobcaygeon including  
Lakes Pigeon, Ball, Buckhorn and Chemong. The  
dam is effective..... 125

*Bobcaygeon.*

There are 2 dams here with Canal, lock and slide. The dams  
keep up the level to Fenelon Falls and to the reach as  
far as Lindsay Lock..... 140½

*Fenelon Falls.*

A large slide and booms which are effective..... 155½

*Lindsey.*

The old lock, owing to dilapidations having become useless,  
was rebuilt by the Provincial Government. Its dimen-  
sions are 134 x 34 feet with 5 feet water on the sills.  
The navigation is, by this work, extended to Port Perry,  
Lake Scugog..... 161½

The dimensions of the Dominion locks are 133 feet 6 inches x 33 feet with 5 feet  
depth of water on the sills.

In 1855 a portion of the above named works were transferred to a committee of  
gentlemen connected with the lumber trade. The Committee was authorized to collect  
Tolls on timber passing through. The works so transferred, at this date, are the  
slides and booms at Chisholm's Rapids, the retaining boom at Myersburgh, the guide  
boom at Campbellford, the dams and slide booms at Middle Falls, the retaining boom  
at Crow Bay and the slide at Heeley's Falls.

These works are kept in repair by the Committee.

The remaining works of this navigation are under the control of the department  
excepting the Lindsay lock constructed in 1870 by the Province of Ontario.

During the past season, the following works have been executed :—

*Fenelon Channel.*

The piers and booms have been generally repaired.

*Bobcaygeon.*

Repairs have been made to the upper and lower dams. Swing bridge temporarily repaired. Some repairs made to lock.

*Buckhorn.*

Piers of slide repaired. New stop logs furnished. Boulders at feet of apron have been removed.

*Little Lake.*

The piers and boom have been repaired.

*Whitlows' Rapids.*

The dam was partially planked, the lock chamber cleaned, the guard boom extended and two piers constructed.

The "Yankee Bonnet" shoal has been partially removed.

*Hastings.*

Repairs have been made to lock gates and sluices in head gates. (Appendix 9, pages 43-45.)

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## LANDS AND LEASES.

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A statement with full detail is given (Appendix 17, pages 80-94) of the water power and other property on the canals, leased by the Department during the fiscal year, and of all property purchased and sold, setting forth the names of the parties interested, the prices paid, and the circumstances under which each transaction took place; likewise of the property declared to be no longer under the control of the Department.

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## ARBITRATIONS

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During the fiscal year 617 claims were before the arbitrators, the amount claimed being \$401,229.03. 311 cases, involving an aggregate amount claimed of \$179,867.60 were arbitrated upon, the amount awarded being \$25,235.30.

On 1st July, 1877, there remained 306 claims to be settled, involving an amount of \$221,361.43. (Appendix 18, pages 96-115.)



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## PUBLIC BUILDINGS.

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### HALIFAX.

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The heating apparatus of the Dominion Building has been re-arranged. (Appendix 16, page 76.)

#### QUARANTINE STATION.

Repairs have been made.

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### PICTOU.

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#### CUSTOM HOUSE.

This building has been completed and occupied. (Appendix 16, page 79.)

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### SYDNEY, CAPE BRETON.

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#### MARINE HOSPITAL.

The hospital has been completed, roads formed, fences erected, and drains constructed. The building has been occupied.

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### DORCHESTER.

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The new Penitentiary for the Maritime Provinces, under contract, is being carried on satisfactorily. (Appendix 16, page 75.)

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### NEWCASTLE, NEW BRUNSWICK.

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#### CUSTOM HOUSE.

The damages which resulted from the fire of the 8th October, 1876, have been made good.

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### CHARLOTTETOWN, P.E.I.

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New heating apparatus has been placed in the Dominion Building. (Appendix 16, page 76.)

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### QUARANTINE STATION, GROSSE ISLE.

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The Island is 30 miles below Quebec.

The deficiency in the stone filling of the superstructure of the western pier has been made good. The buildings have been repaired.

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## QUEBEC.

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### POST OFFICE AND OFFICE OF INSPECTOR OF GAS.

The necessary repairs have been made to these buildings.

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## QUEBEC AND LEVIS.

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### FORTIFICATIONS.

Some necessary repairs have been made. (Appendix 16, page 75.)

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## THREE RIVERS.

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### CUSTOM HOUSE.

The fences and out buildings are now in progress. (Appendix 16, page 75.)

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## MONTREAL.

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### EXAMINING WAREHOUSE.

It is anticipated that this building will be completed this fall.

### ST. HELEN'S ISLAND.

The necessary repairs to the buildings have been executed. (Appendix 16, page 74.)

### CUSTOM HOUSE.

This building has been repaired.

### INLAND REVENUE.

Repairs have been made to this building.

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## ST. VINCENT DE PAUL PENITENTIARY.

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Extensive additions to the Penitentiary are now in progress. (Appendix 16, page 74.)

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## ST. JOHN'S, ON THE RICHELIEU.

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### POST OFFICE, CUSTOM HOUSE AND CANAL OFFICE.

A design for this building has been made and tenders will be at once asked for. (Appendix 86, page 75.)

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**OTTAWA.**

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**HOUSES OF PARLIAMENT AND DEPARTMENTAL BUILDINGS.**

The chamber of the Supreme Court has been completed.

The clock chamber of the tower has been placed in condition to receive the clock ordered from Messrs. Dent & Co., of London.

The new library is finished and occupied.

The works are so far advanced in the West Block extension that it is anticipated, with the exception of the main tower, the wing will be ready for occupation in the fall of 1878.

The various buildings have been kept in general repair.

The improvements of the grounds are nearly completed with the exception of that portion in rear of the workshops and the new extension, where work is now being carried on.

The new iron gates have been placed in position.

An enclosure wall to the workshops has been constructed.

**POST OFFICE, CUSTOM HOUSE AND INLAND REVENUE OFFICE.**

The sidewalks and terrace have been completed and the rear fenced in.

**RIDEAU HALL.**

Additions have been made to Secretary's apartment and the rear wing. The Buildings have been kept in repair. (Appendix 16, pages 71-73.)

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**KINGSTON.**

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The Fortifications have generally been repaired.

Additional buildings to the Military College are in progress and will be ready for occupation next year.

Repairs have been made in connection with custom house and post office. (Appendix 16, page 73.)

**IMMIGRANT BUILDINGS.**

Some repairs have been executed.

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**TORONTO.**

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**EXAMINING WAREHOUSE.**

A hoist with engine has been erected.

**CUSTOM HOUSE.**

The building is now occupied.

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**POST OFFICE.**

The walls and ceilings have been colored. (Appendix 16, pages 73, 74.)

**IMMIGRANT STATION.**

Some repairs have been made.

**MAGAZINE (OLD AND NEW FORT.)**

This building has been placed in repair.

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**GUELPH.**

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**POST OFFICE, CUSTOM HOUSE AND INLAND REVENUE OFFICE.**

It is anticipated that the building now in contract will be ready for occupation early next year. (Appendix 16, page 74.)

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**LONDON.**

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**CUSTOM HOUSE.**

Extra accommodation has been obtained for the Inland Revenue Department.

**MILITARY GROUNDS.**

Fuel sheds and fencing have been completed. (Appendix 16, page 74.)

**POST OFFICE.**

This building has been repaired.

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**WINNIPEG.**

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**CUSTOM-HOUSE, POST OFFICE, LANDS AND REVENUE OFFICES.**

These offices have received the necessary fittings and furniture.

The sheds and fences have been completed.

**FORT OSBORNE BARRACKS, NEAR WINNIPEG.**

A building has been placed at the disposal of the Department of Agriculture for the storage of grain. It had to be strengthened in order to sustain this weight, and was further repaired.

**PENITENTIARY, STONY MOUNTAIN.**

This building has been completed and is occupied. (Appendix 16, page 76.)

**MOUNTED POLICE STATION, RIVER BATTLE.**

Plans of barracks for 50 men, officers' quarters, stabling, outbuildings and powder magazine have been prepared by the Department. The work will be done under its superintendence.

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**BATTLEFORD, NORTH-WEST TERRITORIES.**

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The residence of the Lieutenant Governor will be ready for occupation at the end of October 1877.

Houses have been constructed for the Stipendiary Magistrate, the Registrar, the Clerk of the Council.

A Registry Office has likewise been built.

Quarters have been constructed for the Commandant.

These buildings will be ready by the end of the fall of 1877. (Appendix 16, page 77.)

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**WESTMINSTER, BRITISH COLUMBIA.**

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**PENITENTIARY.**

The contract work has been completed. The fittings and furniture are now being made. (Appendix 16, page 77.)

**PUBLIC BUILDINGS, BRITISH COLUMBIA.**

These buildings generally have been repaired.

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**ROCKWOOD ASYLUM.**

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In accordance with Act 34 Vict., chap. 26, which authorizes the sale of the Rockwood Asylum to the Province of Ontario, an arrangement has been made by which the Province is to pay the sum of \$96,500 for the freehold and buildings, and to take at a valuation the furniture and chattels upon the premises. All contracts for supplies were assumed by Ontario.

This agreement was sanctioned by Parliament, 40 Vict., chap. 38. The agreement went into operation 1st July, 1877.

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# RAILWAYS.

## INTERCOLONIAL RAILWAY.

### LENGTH OF LINE.

#### *Ocean Mail Line.*

	Miles.
River du Loup to Moncton.....	374
Moncton to Painsec.....	8
Painsec to Truro.....	118
Truro to Windsor Junction.....	48
Windsor Junction to Halifax.....	14
	<u>562</u>

#### *Extensions.*

Moncton to St. John.....	89
Painsec to Shediac.....	11
Truro to Pictou.....	52
Windsor Junction to Windsor.....	32
	<u>184</u>
	746

#### *Local Branches.*

Rimouski to Wharf.....	2
Newcastle, N.B., to Deep Water Wharf.....	2
Dorchester to Shipping Wharf.....	1
Sackville to Shipping Wharf.....	0.5
Stewiacke to Wharf.....	1 6.5
	<u>752.5</u>

The total expenditure and capital account on the entire line up to 30th June, 1877, is \$35,682,249.11.

The following amounts chargeable to capital account have been expended during the last fiscal year:—

General payments for works between River du

Loup and Truro.....	\$965,175 77
Balance due 30th June, 1876, since paid. ....	38,881 39
	<u>1,004,057 16</u>
Snow sheds between Moncton and Truro.....	1,042 14
Halifax Extension.....	214,433 56
St. John, Deep Water Terminus.....	98,819 33
	<u>314,295 03</u>
	<u>\$1,318,352 19</u>

The gross earnings for the year have been \$1,154,445 35.

The cost of working the line, with maintenance and renewals, is shewn in the statement of moneys expended by the Department during the fiscal year ended 30th June, 1877, (Appendix 1, page 6) as \$1,661,673.55. In this amount is included the sum of \$200,000 on account of renewing the iron rails on the old Provincial lines with steel rails.

Deducting this amount, the cost of working expenses for the fiscal year ended 30th June, 1877, is \$1,461,673.55.

The grading and masonry of the Halifax extension from the old Richmond Station to North Street, have been completed, and the rails will be laid in the fall of 1877. The passenger station has been completed, the sidings laid in yard, a store-house for ocean freight built, and additions made to the wharf.

At St. John the grading of Courteney Bay branch to deep water wharf, commenced 1871, has been completed and the track laid and ballasted. At the end of the extension a deep water cribwork wharf, including a slip—Contractor, Mr. Wilnot Kennedy—is under construction. The wharf will have a face of 1,820 feet. The height of the cribwork will be 55 feet standing 4 feet above extreme high water, with a depth of 25 feet at low water. The breakwater east of the slip facing the sea, has a length of 865 feet at the outer end.

The work has recently been commenced. The foundations for the seat are now being dredged by the Department.

Seven miles of snow sheds and eleven miles of snow fences have been constructed, making a total of 12½ miles of snow sheds and 44½ miles of snow fences.

The Rimouski pier has been extended to accommodate the steam tender to the ocean mail service, and the station siding and yard accommodation between River du Loup and Moncton has been increased.

At Stewiacke a branch three quarters of a mile in length, connecting with the navigable waters of the River Stewiacke, has been constructed.

The line throughout is reported in good condition, generally with steel rails with sound sleepers, good road bed, fences in repair, buildings in good condition, water service efficient, rolling stock in good order, shops well supplied, and the whole line in a good state of maintenance.

In accordance with the Resolution of the House of Commons authorizing the Government to lend rails as they are removed from the Government Railway lines which may be required on feeders, the worn iron rails removed from the main line have been lent for use to the Chatham, the Elgin, the Londonderry, the St. Martins and Upham, and the Hillsboro', tributary branches.

In the season of navigation the ocean steamers receive the mails at Rimouski, in winter they are delivered at Halifax.

The quickest time made was 15½ hours for 561 miles between Halifax and River du Loup, 36 miles an hour.

The cost per train per mile is 82 cents.

The average cost of working per mile has been \$2,327.27.

No casualties are reported.

The general maintenance is detailed Appendices Nos. 15 and 21.

## PRINCE EDWARD ISLAND RAILWAY.

### LENGTH OF LINE.

	Miles.
Tignish to Royalty Junction.....	113½
Royalty Junction to Mount Stewart.....	20
Mount Stewart to Georgetown. . . . .	21
	— 154½

### EXTENSIONS.

Royalty Junction to Charlottetown.....	5
Mount Stewart to Souris... ..	39
	— 44
	— 198½

The capital account now amounts to.....\$3,403,367 84

The gross receipts during the year have been ..... 130,664 92

An increase on last year of..... 12,603 92

The working expenses were..... 226,595 25

This amount includes \$18,267.17 for the substitution of steel rails 50 lbs. to the yard, for the present iron rail of 40 lbs. laid between Charlottetown and Royalty Junction, a distance of 5½ miles.

The amount of passenger traffic has decreased owing to the introduction of second class cars and the issue of return tickets. Freight has increased \$17,908.64.

During the winter of 1876-7, the steamer "Northern Light" made the connection between the main land and Georgetown, Prince Edward Island, across the Straits of Northumberland. This vessel, built specially for the Marine Department for this duty, is the first steamer which has successfully established a regular winter connection. Hitherto steam navigation has been held not to be practicable owing to the extensive ice floes here encountered. This steamer was constructed on the theory of cutting through these obstacles, and for navigating these waters during winter.

The rolling stock has been increased, machine shops have been constructed and supplied with machinery. Board fencing for the greater part of the distance has been substituted for the wire fencing. The yard at Charlottetown has been graded. New siding has been laid down. The wharf at Summerside has been raised, several way stations have been erected and houses built for the trackmen, with various minor works.



19½ miles of snow fencing has been erected and has proved efficient. Additions to it are in progress.

The line generally is in fair condition, but the cost of renewals and improvements for some time will not be slight.

The cost of working a train per mile without taking account of rail renewals was 85·74 cents per mile.

There have been four casualties on the line during the year, one fatal, three persons being injured. (Appendix 20, page 121.) /

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### CANADIAN PACIFIC RAILWAY.

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By the Act 37 Vict., c. 14, it is enacted that, "Within one month of the opening of each Session, a report of the progress of the works, and of the sums expended, together with copies of all contracts entered into since the last report, shall be presented to Parliament."

In accordance with the above provisions the report of the Acting Chief Engineer sets forth the works constructed and in progress up to the 31st December, 1877, with the contracts entered into and the amounts expended during the fiscal year ended 30th June, 1877, together with the progress made in the several surveys, and the results which have been attained by such examinations.

(Appendix 22, page 179.)

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### NORTH-WESTERN COMMUNICATION.

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It has been considered expedient to cancel the contract for moving passengers and freight by this route from Thunder Bay to Winnipeg. This contract would have expired on the close of the navigation of 1876. Notice was, however, given on the 16th February, and the contract cancelled on the 29th April, 1876.

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### FORT FRANCES CANAL.

---

The design is to construct a canal 800 feet in length and 36½ feet in width at the narrowest part, with a lock 200 feet in length by 36 feet in width, having 7 feet depth on the sills with entrance guide piers. The ordinary lift of the lock to be 23½ feet.

It is located near the outlet of Rainy Lake, on the north side of the Grand Falls, being 237 miles from Thunder Bay, Lake Superior, and 215 miles east of Winnipeg.

This canal will connect the 44 miles of navigable water of Rainy Lake with Rainy River and the Lake of the Woods, making a continuous navigation, from Kettle Falls to the north-west angle, of 164 miles, with 7 feet depth of water.

Some improvements will be required in the channel to attain this depth in the navigation, viz.: At  $1\frac{1}{2}$  miles above, at the Manitou Rapids 36 miles, and at the Long Sault Rapids 42 miles below Fort Frances.

The rock excavation of the lock-chamber is nearly completed. The timber for the gates will be obtained during winter.

## BRITISH COLUMBIA.

### TELEGRAPH.

The telegraph is in operation as follows :—

	Distance in miles.
From Victoria, Vancouver's Island, to Saanich, V. I. . . . .	15
From Saanich, Vancouver's Island, to Swinomish, Washington Territory, including five submerged cables.....	60
These cables are each $\frac{1}{4}$ of an inch in diameter, with seven conducting No. 19 copper wires, twisted together and insulated with two coverings of gutta percha $\frac{3}{8}$ inch diameter, with armour of twelve No. 8 galvanized iron wires. The total length of the cables is $18\frac{1}{2}$ miles. Weight about 5,000 lbs. to the mile.	
From Swinomish to Matsqui, on the River Fraser.....	68
Matsqui to New Westminster, River Fraser.....	36
Matsqui to Hope " .....	59
Hope to Yale " .....	14
Yale to Lytton " .....	57
Lytton to Quesnelle " .....	271
Quesnel to Barkerville, Cariboo " .....	52

There is also a branch of ten miles from New Westminster to Burrard's Inlet constructed by Messrs. Moody & Co.

No breaks occurred in the submerged cables.

The land portion of the line is in fair order.

The expenditure during the year has been \$31,108.74. The revenue \$7,367.42.

Experience has established the fact that the line will always be expensive to maintain.

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BEAVER ROCK, VICTORIA HARBOR.

---

The work of removing this rock is still unfinished, and but little progress has been made during the year in this work. (Appendix 19, page 118.)

I have the honor to be, Sir,

Your obedient Servant,

T. TRUDEAU,

*Deputy*

*of the*

*Minister of Public Works.*

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**ANNUAL REPORT**

**OF THE**

**MINISTER OF PUBLIC WORKS**

**FOR THE FISCAL YEAR JULY 1ST, 1876 TO 30TH JUNE, 1877.**

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**APPENDICES.**

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## APPENDIX No. I.

STATEMENT showing the amount expended by the Department of Public Works, Dominion of Canada, during the Fiscal Year ended 30th June, 1877.

Name of Work.	Construction.	Repairs.	Staff and Maintenance.
<i>Canals.</i>	<i>\$ cts.</i>	<i>\$ cts.</i>	<i>\$ cts.</i>
Lachine.....	1,439,375 73	19,824 33	33,148 86
Beauharnois.....	15,207 36	14,377 63	14,377 63
Cornwall.....	49,211 37	6,440 54	13,375 70
Williamsburgh.....	10,053 61	7,388 08	
St. Lawrence.....	47,377 31		
Welland.....	2,183,147 61	50,048 93	59,693 47
do damages.....	16,815 00		
Burlington Bay.....		489 34	
St. Anne's Lock.....	30,003 08	1,756 93	1,982 63
Carillon and Grenville.....	175,284 20	10,304 06	11,050 27
Carillon Canal and Dam.....	70,453 84		
Culbute Rapids Lock.....	56,081 87		
Rideau.....	214 11	14,198 18	25,959 56
St. Our's Lock.....		750 80	1,533 40
Chambly.....	80 00	10,111 32	10,281 78
St. Peter's.....	63,330 18	17 45	600 00
Bas de la Rivière.....	22 30		
Canals generally.....			51 87
Maitland Pier.....			60 00
<i>Slides and Booms.</i>			
Saguenay.....		518 08	741 05
St. Maurice.....		5,892 27	13,675 26
Ottawa.....	120 00	20,523 65	21,168 36
Newcastle.....		3,540 89	2,325 03
<i>Harbours and Piers.</i>			
Bayfield, Ontario.....	21,200 00		
Chantry Island Breakwater, do.....	36,095 12		
Cobourg, do.....	8,060 41		
Colpoys's Range Pier, Big Bay, do.....		400 00	
Goderich, do.....	86,175 10		
Emcardine, do.....	10,514 66		
Neeshish Rapids, do.....	9,601 92		
Port Burwell, do.....	5,173 75		
Port Hope, do.....		4,000 00	
Port Stanley, do.....	3,391 21		
Thunder Bay, do.....	5,900 5		
Toronto, do.....	17,000 00		



## APPENDIX No. 1—Continued.

Name of Work.	Construction.	Repairs.	Staff and Maintenance.
	\$ cts.	\$ cts.	\$ cts.
<i>Harbours and Piers—Concluded.</i>			
Berthier Pier, Quebec.....		3,938 17	
L'Islet Pier, do .....		2,821 19	
Malbaie Pier, do .....		141 80	
Rivière Blanche Breakwater, do .....		1,080 16	
Rivière du Loup Pier, do .....		909 30	
Rivière Ouelle do do .....		1,213 78	
River Richelieu, do .....	4,125 87		
River St. Lawrence, removal of chains and anchors. do .....	12,000 00		
do Deepening between Quebec and Montreal.....	122,000 00		
Grande Anse, New Brunswick.....		998 98	
Richibucto, do .....	1,621 44		
Shippegan, do .....	9,135 63		
St. John, do .....	65,000 00		
St. John River, do .....		55 00	
Chipman's Brook, Nova Scotia.....	2,750 00		
Cow Bay, do .....	8,656 13		
Ingonish, South, do .....	24,851 60		
L'Ardoise (breakwater between Michaud and Mark Points), N.S. ....	10,228 29		
Lingan Beach, Nova Scotia.....	2,000 00		
Mabou, do .....	1,750 00		
Musquodoboit, do .....	1,000 00		
McNair's Cove, do .....	115 50		
Port Hood Pier, do .....		964 81	
Tracadie, do .....		873 70	
Colville Bay (Souris), Prince Edward Island.....	19,871 33		
New London, do .....		500 00	
Tignish, do .....	4,750 00		
Dredge Vessels.....	3,142 99		
Dredging, Ontario and Quebec.....	12,582 83		
do Maritime Provinces.....	70,765 91		
do British Columbia.....	566 62		
<i>Surveys.</i>			
Pacific Railway.....	751,624 57		
Generally.....			37,405 77
Arbitrations and Awards .....			6,234 20
<i>Roads.</i>			
Red River Route.....		7,236 56	19,881 98
<i>Public Buildings.</i>			
Generally.....			5,870 89
Fort Lennox Barracks, Ontario .....		5 00	
Guelph Custom House, &c., do .....	13,111 74		
Hamilton Custom House, do .....		35 00	
do Post Office, do .....		41 54	
Kingston Custom House, do .....		265 97	
do Immigrant Buildings, do .....		248 22	
do Rockwood Asylum, do .....		23 90	
do Military College, do .....	33,729 79		

## APPENDIX No. 1—Continued.

Name of Work.	Construction.	Repairs.	Staff and Maintenance.
	\$ cts.	\$ cts.	\$ cts.
<i>Public Buildings—Continued.</i>			
Kingston Penitentiary, Ontario.....		4,853 69	
do Post Office, do .....		149 11	
London Custom House, do .....		1,007 00	
do Drill Shed, do .....		600 00	
do Post Office, do .....		671 64	
Ottawa Parl't and Departmental Bldgs., Ontario...	258,833 09	97,735 13	
do do Gas, do .....			18,000 00
do do Heating, do .....			40,000 00
do do Removal of snow, do .....			1,023 80
do Post Office, do .....	18,136 34	314 90	
do Public Buildings, Post Office and Rideau Hall (Water), Ontario.....			4,500 00
do Rideau Hall, do .....		35,991 28	5,000 00
Toronto Custom House, do .....	41,939 18		
do do and Ex. Warch'se, Repairs.....		196 75	
do Examining Warehouse, Ontario.....	33,196 87		
do Immigrant Station, do .....		423 72	
do Magazine (Old and New Forts), do .....		2,122 39	
do Post Office, do .....		2,716 22	
do Savings Bank Building, do .....		253 00	
Grosse Isle Quarantine Station, Quebec.....	3,671 68	876 06	
Montreal Custom House, do .....		1,326 40	
do Examining Warehouse, do .....	110,229 15		
do Inland Revenue Office, do .....		449 80	
do Post Office, do .....	11,186 95		
Quebec Citadel Buildings, do .....		794 46	
do Cutlers' Office, do .....		20 00	
do Custom House, do .....		34 60	
do Fortifications (Quebec & Lewis), do .....		5,927 60	
do Inspector of Gas, &c, Office, do .....		1,173 49	
do Observatory, do .....		10 00	
do Post Office, do .....		1,079 36	
do Public Buildings, do .....		75 40	
St. Helène Magazine, do .....		184 50	
St. Vincent de Paul Penitentiary, do .....	5,907 39		
New Castle Custom House, New Brunswick.....		450 00	
St. John do do .....		76 28	
do Post Office, do .....	4,146 31		800 00
do do (oil), do .....			
do Quarantine Stat'n (Partridge Island), N.B....		28 00	
Halifax Dominion Building, Nova Scotia.....		1,851 38	
do Quarantine Stat'n (Lawlor's Island), N.S....		228 00	
Pictou Custom House, Nova Scotia.....	7,364 47		
Halifax Marine Hospital, do .....	2,123 60		
Yarmouth do do .....	550 00		
do Quarantine Station, do .....		35 00	
Charlottetown Dominion Bldg., Prince E. Island...		5,461 89	
Norris Marine Hospital, do .....	807 75		
New Westminster Penitentiary, British Columbia...	47,216 11		
Public Buildings, do .....		1,564 02	
Manitoba Custom House.....	5,057 98	1,422 16	
do Fort Osborne Barracks.....		2,756 50	
do Penitentiary.....	39,791 04		
Sault River Barracks, N. W. Territory.....	29,982 13		
Lt. Gov.'s Residence, Battleford, do .....	25,429 99		

APPENDIX No. 1.—*Concluded.*

Name of Work.	Construction.	Repairs.	Staff and Maintenance.
	\$ cts.	\$ cts.	\$ cts.
<i>Public Buildings—Concluded.</i>			
Penitentiaries generally.....		5,000 00	
Maritime Provinces Penitentiary, Dorchester, N. B. ....	20,294 22		
Telegraph Lines, British Columbia .....			27,108 74
do do Subsidy .....			4,000 00
do Prince E. Island, do .....			1,946 66
<i>Railways.</i>			
Pacific Railway.....	936,525 40		
Intercolonial Railway.....	1,318,352 19		1,661,673 55
Prince Edward Island Railway.....	200,000 00		228,595 25
Totals .....	8,633,928 13	373,298 55	2,279,458 81
Grand Total.. ..			\$11,286,685 49

J. BAINE,

*Accountant.*

DEPARTMENT OF PUBLIC WORKS,

OTTAWA, 30th June, 1877.

## APPENDIX No. 2.

## ST. LAWRENCE NAVIGATION.—TABLE OF DISTANCES.—A.

FROM STRAITS OF BELLE-ILE TO DULUTH, AT HEAD OF LAKE SUPERIOR, BY WATER.

From	To	Sections of Navigation.	Statute Miles.	
			Inter- mediate.	Total to Straits of Belle-Ile.
Straits of Belle-Ile.....	Cape Whittle.....	Gulf of St. Lawrence.....	240	240
Cape Whittle.....	West Light, Anticosti.....	do do.....	201	441
West Light, Anticosti.....	Father Point.....	River St. Lawrence.....	202	643
Father Point.....	Rimouski.....	do.....	6	649
Rimouski.....	Bic.....	do.....	12	661
Bic.....	Isle Verte.....	do.....	39	700
Isle Verte (opp. Saguenay).....	Quebec.....	do.....	126	826
Quebec.....	Three Rivers.....	do to Tidewater.....	74	900
Three Rivers.....	Montreal.....	do.....	86	986
Montreal.....	Lachine.....	Lachine Canal.....	8 $\frac{1}{2}$	994 $\frac{1}{2}$
Lachine.....	Beauharnois.....	Lake St. Louis.....	15 $\frac{1}{2}$	1,009 $\frac{1}{2}$
Beauharnois.....	St. Cécile.....	Beauharnois Canal.....	11 $\frac{1}{2}$	1,021
St. Cécile.....	Cornwall.....	Lake St. Francis.....	32 $\frac{1}{2}$	1,053 $\frac{1}{2}$
Cornwall.....	Dickinson's Landing.....	Cornwall Canal.....	11 $\frac{1}{2}$	1,065 $\frac{1}{2}$
Dickinson's Landing.....	Farran's Point.....	River St. Lawrence.....	5	1,070 $\frac{1}{2}$
Farran's Point.....	Upper end of Croyle's Island.....	Farran's Point Canal.....	4	1,071
Upper end Croyle's Island.....	Williamsburgh or Morris- burgh.....	River St. Lawrence.....	10 $\frac{1}{2}$	1,081 $\frac{1}{2}$
Williamsburgh.....	Rapid Plat.....	Rapid Plat Canal.....	4	1,085 $\frac{1}{2}$
Rapid Plat.....	Point Iroquois Village.....	River St. Lawrence.....	4 $\frac{1}{2}$	1,090
Point Iroquois Village.....	Upper end Presqu'île.....	Point Iroquois Canal.....	3	1,093
Presqu'île.....	Point Cardinal, Edwards- burgh.....	Junction Canal.....	2 $\frac{1}{2}$	1,095
Point Cardinal.....	Head of Galops Rapids.....	Galops Canal.....	2	1,097 $\frac{1}{2}$
Galops Rapids.....	Prescott.....	River St. Lawrence.....	7 $\frac{1}{2}$	1,105 $\frac{1}{2}$
Prescott.....	Kingston.....	do.....	59	1,164
Kingston.....	Port Dalhousie.....	Lake Ontario.....	170	1,334
Port Dalhousie.....	Port Colborne.....	Welland Canal.....	27	1,361
Port Colborne.....	Amherstburgh.....	Lake Erie.....	232	1,593
Amherstburgh.....	Windsor.....	River Detroit.....	18	1,611
Windsor.....	Foot of St. Mary's Island.....	Lake St. Clair.....	25	1,636
Foot of St. Mary's Island.....	Sarnia.....	River St. Clair.....	33	1,669
Sarnia.....	Foot of St. Joseph's Island.....	Lake Huron.....	270	1,939
Foot of St. Joseph's Island.....	Foot of Sault St. Mary.....	River St. Mary.....	47	1,986
Sault St. Mary.....	Head of Sault St. Mary.....	Sault St. Mary Canal.....	1	1,987
Head of Sault St. Mary.....	Point aux Pins.....	River St. Mary.....	7	1,994
Point aux Pins.....	Duluth.....	Lake Superior.....	390	2,384

Of the 2,384 miles from the Straits of Belle-Ile to the Head of Lake Superior, 71 $\frac{1}{2}$  miles are artificial navigation, and 2,312 $\frac{1}{2}$  open navigation.

Straits of Belle-Ile to Liverpool, 1,942 geographical, or 2,234 statute miles.

The total fall from Lake Superior to Tide-water is about 600 feet.

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**APPENDIX No. 2—Continued.**


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**TABLE OF DISTANCES.—B.****FROM PRINCE ARTHUR LANDING (LAKE SUPERIOR), TO FORT GARRY (WINNIPEG), BY THE CANADIAN ROUTE.**

	Statute Miles.	
	Inter- mediate.	Total.
Prince Arthur Landing to Shebandowan Lake.....	45	45
Shebandowan Lake to North-West Angle.....	312	357
North-West Angle to Fort Garry (Winnipeg).....	95	452

The Steamboat voyage from Collingwood to Prince Arthur Landing is 532 miles.

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## APPENDIX No. 3.

CANAL OFFICE,  
MONTREAL, July 1877.

SIR,—I have the honor to submit the following report on the works under my charge for the fiscal year ended 30th June, 1877.

The old works have all been efficiently maintained during the year and fair progress made in the construction of the new works, except at Carillon, where little has been done.

Statements of the amounts collected for fines and damages with monthly returns of the highest and lowest water on each canal are appended.

### LACHINE CANAL.

In the early part of the fiscal year, from July to November 1876, the principal work done was repairing the supporting piers of the booms at Lachine, and building a stop gate at Lock No. 5.

Of these piers, 19 are 52 ft. long by 15 ft. wide. The superstructure was entirely removed and rebuilt to a height of seven feet above low water. The stop gate is built solid, of oak and pine timber, and is 49 ft. long by 16 ft. high, 22 inches thick at bottom and 18 inches at top. It is intended to be used at the lower gate quoins of Lock No. 5 to stop the flow of water should the entire four gates be carried away by accident or otherwise.

Five pairs of spare lock gates were launched and sunk in convenient places for use when required.

To enable the work of enlargement to be proceeded with, this canal was unwatered during the winter. The water was shut off on the 2nd day of December and the gates removed from Locks Nos. 3 and 4. The superstructure of Brewster's Bridge was taken down and removed for the same reason.

During the winter the bridges over the large weir at basin No. 2 and over the small supply weir at Lachine were rebuilt, and superstructure of pier below Lock No. 5 renewed. The gates of Locks Nos. 3 and 4 were furnished with new binders, the valves taken out and repaired, quoins lengthened to fit the new masonry, and the whole painted.

In April, the walls of Locks Nos. 1 and 2 and of the weirs at Basin No. 2 and at Côte St. Paul were pointed. A large quantity of concrete was placed in front of the flumes in Basin No. 2 and at the large weir. The flooring of the tail race below the weir at Lock No. 4 was partially sheeted with plank, and the weir gates received new working chambers, brasses etc.:—Two new valves were placed in the upper gates of Lock No. 2. The entire roof of Flour shed No. 2 and one half of that of No. 1 was covered with asbestos coating.

The water was partially let into the canal on Wednesday, May 2, and the four pairs of gates placed in Locks Nos. 3 and 4, the anchor irons having been previously placed and bolted to receive them. The canal was filled on Sunday the 6th and opened for navigation on Monday the 7th of May.

Since that date all the gates in Locks Nos. 3 and 4 were provided with suspension gear, the wharves and bridges repaired and replanked, and a number of leaks staunches. A great number of snubbing posts were also placed in the new banks.

The navigation of this canal was interrupted for 24 hours on Monday 11th of June while a bad leak was being stopped at the large weir at head of Basin No. 2.

A leak from the old Lock No. 3 into the pit of the new lock was closed at the same time. The water was drawn down five times between Saturday night and Monday morning in May and June, while leaks were being stopped in the bank at upper end of Section 8 and lower end of Section 9.

#### STEAM DREDGE.

The dredge "Queen" and scows are now in the Lachine Canal being fitted up for service at St. Anne's, where they will commence operations as soon as the old boiler and engine have been replaced with new ones of greater power, which were procured for that purpose about three years ago, the old boiler and engine having become practically useless except for the lightest kind of dredging.

#### NEW WORKS OF ENLARGEMENT.

The general plan of this enlargement may briefly be said to consist in forming new entrances at Montreal and Lachine, widening and deepening the prism and duplicating the locks.

It provides for the construction of a channel between the harbor of Montreal and Point St. Charles for vessels drawing 18 ft. of water, and thence upwards to Lachine for vessels drawing 12 feet.

From Basin No. 2 just below the Wellington Bridge to Lock No. 4 at Côte St. Paul, the prism of the present canal is to be enlarged to an average breadth of 200 ft. and from Côte St. Paul to Lachine to an average breadth of 150 ft., with a depth of 13 feet throughout, between these points.

The locks to be 270 feet long between gate quoins, and 45 feet wide at bottom. The two lower locks to have 18 feet of water on mitre sills, and the others 14 feet. The depth of 14 feet on the sills of the locks on the upper reaches is a provision made to meet any future deepening of the canal to give 15 feet of water between the locks. All the other structures have had their foundations laid at that depth.

For convenience in construction, this work has been divided into eleven sections numbering from the lower end.

#### *Section No. 1.*

Sections Nos. 1 and 2 are let in one contract to Messrs James Worthington & Co. The work on Section No. 1 includes forming a new connection with the Harbor of Montreal, the construction of two locks and an intermediate basin, with a regulating weir and bridge abutments. The locks are 270 feet in length between gate quoins, 45 feet in width at bottom and have a depth of 18 feet water on the mitre sills. The basin is 540 feet long by 240 feet wide at the north end and 230 feet at the south end, and has a depth of 19 feet.

#### *Lock No. 1.*

Work was resumed on the 7th July, 1876, after the high water subsided—at that time about three feet of earth remained in the lock pit above foundation level. The excavation of this material, as well as for concrete below that level, was continued during the balance of the season. At the upper end of the pit the bottom was so soft that it was necessary to drive sheet piles along the edge of the pit to prevent the sides from running in. Bearing piles were also driven along the face line of the lock walls to support the foundation timbers.

At the close of the season the excavation was completed except about 1000 cubic yards at lower end, and the foundation, formed of concrete, timber and plank, laid for a distance of 170 feet from the upper end including the upper mitre sill platform.

Masonry was commenced on the 30th of October on the breast wall, and continued downwards on both sides for a distance of 130 feet and to a height of five feet. A large quantity of stone was placed on the timber foundation to prevent it from raising during high water.

During the winter and spring the work was flooded by the river and again unwatered on the 16th of May.

The timber foundation is now extended to within 17 feet of the lower mitre sill platform, and the masonry, with an additional course, to within 35 feet of the same place.

#### *Basin No. 1.*

During the summer of 1876, the dock walls surrounding this basin were completed except the coping and as much as was necessary to connect with the wing walls of Lock No. 1. The coping has not been completed, but the connection is made with Lock No. 1. The excavation is nearly finished.

#### *Lock No. 2.*

The concrete and timber foundation, below the lower mitre sill, was completed early in the summer of 1876, and the connection made between the lower wing walls and the dock walls of Basin No. 1.

At the close of the season the side and wing walls were built up to an average height of 21 feet, and the breast wall completed. They are now 29 feet high, or within five feet of being finished.

The masonry forming the recess at the head of the lock for a submerged gate, and the bridge abutment on the south side is well advanced in connection with the lock walls. The bridge abutment and new portion of dock wall above the old lock were commenced and nearly completed last spring previous to the opening of navigation.

#### *Section No. 2.*

This section embraces the enlargement and deepening of Basin No. 2, and the construction of Wellington Basin. The latter is 1250 feet in length by 225 feet in breadth, and surrounded by a dock wall of ashlar masonry. Both basins to have a depth of 19 feet.

#### *Basin No. 2.*

The enlargement of this basin is made by the removal of a point of land at its upper end. During the summer of 1876, this was being done by a steam excavator, which worked until 30th September, when the work was flooded by a leak from the canal and further operations with the excavator prevented, after which the excavation of this portion was continued by dredging.

Two dredges are now working in the basin, the work is well advanced and will probably be finished this season.

#### *Wellington Basin.*

The excavation of this basin was completed last season and the dock walls were nearly finished when the water broke through the bank from the canal and work on the masonry was suspended for the season.

On the 15th of March work was resumed on the dock walls, and they are now completed except laying a few pieces of coping. The brick sewer is also completed, and the wharf around the basin is being put down, of which about 500 lineal feet are finished.

#### *Section No. 3.*

This section extends upwards about three fourths of a mile from Basin No. 2. The work upon it consists chiefly in the enlargement of the channel, building piers and abutments for Wellington Street Bridge, the construction of a lift lock, regulating weir, raceway and bridge abutments, taking down and rebuilding with new face stone the defective masonry in the walls of present lock, building a dock wall, etc., etc.

Contractors, Messrs. McNamee, Gaherty and Fréchette.



At the close of the last fiscal year excavation was being carried on and embankments made to enlarge the canal outside the present banks, on the north side from St. Gabriel Basin to the tail race below St. Gabriel Lock, and on the south side from the Wellington Bridge upwards for about 800 feet. The north bank was completed and the water let into the cut on that side on 28th of July.

Two powerful dredges with a steam derrick for unloading the excavated material, commenced work on 7th of July in the prism of the old canal between Wellington Bridge and St. Gabriel Lock. About three fourths of the excavation on that portion of the enlargement was done at the close of navigation, and now nearly the whole of the earth that can be removed with dredges has been excavated.

The dock wall on the south side above Wellington Bridge was begun on the 7th of August, and at the close of the season 760 lineal feet of it had been completed, with the exception of coping.

The abutment at south end of Wellington Bridge was also commenced. It is now completed to its junction with the returned end of the dock wall of the Wellington Basin, except coping and a space occupied by a temporary bridge.

As soon as the canal was unwatered excavation was commenced in rear of the old lock, and the walls of the upper recess and chamber were taken down to the depth of 13 feet, and at the lower recess and wings they were entirely removed.

On the 16th of February work was begun on the concrete wall in rear of the north wall of old lock. Its foundation was carried down to the full depth of the foundation of the proposed new lock, which is five feet lower than that of the old one.

During February a foundation of timber, plank and concrete was prepared for the retaining wall to connect the lower wing of the old lock with that of the new one. The masonry of this wall was commenced on the 5th of March, and that of the lock wall on the 14th, the whole of which was completed and ready for the opening of navigation on the 5th of May.

A temporary weir and raceway were constructed on the south side of the present lock, as the old weir had to be removed, it being situated on the site selected for the new lock and weir. It was built of timber and the work was done by the day under the direction of Mr. Superintendent Conway.

Two abutments and a centre pier have been erected for a fixed bridge over the upper entrance to the proposed new weir, which is also a head race for manufacturing purposes.

The site of the new lock and weir pits has been enclosed by coffer dams, and the excavation commenced.

When the water was let into the canal in May a bad leak was found to be running from under the foundation of the old lock into the pit of the new one. This was staunch by driving piles in rear of the lock wall and filling with concrete between the piles and the wall.

#### *Section No. 4*

Is 3,800 feet in length, and includes widening and deepening the canal, facing the inside slope with pitched stone walls, the construction of piers and abutments for two bridges, and making alterations in the culvert of the Montreal Water Works.

Contractors, Messrs. Whitney and Doty.

This work was commenced in June 1876. The enlargement on the upper portion of the section being mostly on the south side, an independent cut was made between Brewster's Bridge and the Grand Trunk Railway, outside of the towing path, which was sunk to the full depth of the enlarged canal, and a new bank formed. The trench for the foundation of side walls was also excavated, and 1130 lineal feet of the wall carried up to an average height of  $7\frac{1}{2}$  feet, which has since been raised to water level.

Two steam dredges were employed after the 7th of August on the west side of the canal, above and below Brewster's Bridge. The abutments of Brewster's Bridge were built, and stone delivered and prepared for the piers. Timber for the cribwork to protect piers was also delivered.

Before the opening of navigation, the south bank of the old canal, which separated it from the new cut, was removed, the retaining wall along the north bank for the same distance well started, and the piers as well as the cribwork of Brewster's Bridge constructed.

The Contractors are now driving the protecting piles at Brewster's Bridge, dredging on the lower portion of the section, delivering stone for the remainder of the retaining wall, and preparing stone for the abutments and piers of the Grand Trunk Railway Bridge. They are also excavating on the island at the lower end of the section, intending to build as much of the wall there as possible during the summer.

On the 29th of March the water overflowed the dam at the upper end of the section and flooded the whole work, which caused a delay of several days while the dam was being repaired and the water pumped out.

At Brewster's road a swing-bridge 120 feet long and two fixed bridges 38 feet long each, were built in place of the old one which had been removed. This new swing-bridge turns on a centre pivot and spans two navigable channels of 46 feet each. The material of the old bridge was used as far as practicable in its construction. The work was done by the day by Mr. Conway, Superintendent of Lachine Canal.

#### *Section No. 5.*

This section extends from a short distance above the Grand Trunk Railway Bridge to within about 700 feet of the Côte St. Paul Lock, and is 4,200 feet long. The work upon it consists in widening and deepening the prism of the present canal, building side walls, and the construction of an inverted syphon culvert to carry the water of the River St. Pierre under the canal.

Mr. Alphonse Charlebois is Contractor.

The enlargement on this section is principally on the north side of the canal, but at the lower end there is also quite a breadth on the south side. During the summer and fall of 1876, nearly all of this excavation that could be taken out without endangering the bank of the old canal was removed and the new bank formed. To secure a proper seat for the embankment at the upper end of the section, a large quantity of muck and marl had to be removed to a depth of from three to four feet below canal bottom. The side wall was built at the upper end of the section for a length of 550 feet to an average height of  $8\frac{1}{2}$  feet. The pit at the north end of the St. Pierre Culvert was excavated and the timber foundation laid.

A large amount of excavation was also done on the south side of the present canal at the lower end of the section, and a new bank formed. A steam dredge was employed on the inside slopes and bottom of the present canal from the 15th of August to the close of the season.

During the winter, excavation was carried on in the bottom of this canal, a portion of the old bank on the north side removed, and side wall masonry built. On the 28th of March, the works were inundated by water flowing over the dam from Section No. 6. After eleven days they were again unwatered and the work continued.

The masonry of the north end of the St. Pierre Culvert has been commenced and the excavation for the south end is well advanced. The side or slope wall on the north bank is being extended, and it has been commenced on the south side at the lower end of the section outside of the old bank. It is expected that as much of these walls as can be built while the water is in the canal, will be completed this season.

Dredging in the prism of the old canal is progressing, and the Contractor is making every exertion to push the work forward as fast as possible.

#### *Sections Nos. 6 and 7.*

These two sections were let together to Messrs Wm. Davis and Sons. Their length is 10,000 feet and the work upon them consists in enlarging the channel; constructing a new lift lock, taking down and rebuilding with new face stone the

defective portion of the present lock, protecting the rear side of the north wall and foundation of the present lock with concrete, building a retaining wall to connect the wing walls of the old and new locks, forming an inverted syphon culvert, building a by-wash, piers and abutments for a swing-bridge at Côte St. Paul, and facing the inside slopes with pitched stone, &c.

The excavation of the prism and lock pit, outside of the existing north bank, was commenced in June, 1876, and the new bank formed from the lower end of Section No. 6 to the Côte St. Paul road, a distance of 1,400 feet, and before the close of the season all the excavation that could be removed with safety on this portion was taken out. Part of this work was attended with great difficulty, where muck and marl, extending to a depth of ten to twelve feet below canal bottom, had to be removed and the site refilled with selected material to form a solid foundation for the embankment.

Two steam dredges with a steam derrick for discharging the material over the bank, commenced operations at the upper end of Section No. 7 on the 1st of September, where they worked till the middle of November.

As soon as the navigation closed, the Contractors began to excavate in rear of the walls of the old lock, and to take them down; which work was continued until the walls on both sides above the lower recess were taken down to the depth of 14 feet, and the remainder to the foundation.

In February the concrete wall was formed in a trench in rear of the old lock, and the foundation of the retaining wall at lower end of lock prepared, both of which are five feet below the foundation of the old lock.

On the 28th of February the masonry was commenced, and building was carried on steadily until the retaining wall was raised above the level of the water in the lower reach, the lock walls rebuilt, and navigation resumed.

During the latter part of the winter, that portion of section No. 6 below the lock and between the old banks was excavated to grade of new canal bottom.

The Contractors are now proceeding with the excavation of the new lock pit, which is nearly completed. The greater part of the timber for the foundation, and stone for the masonry of the new lock has been delivered and prepared. The north abutment for the Côte St. Paul Bridge has been built and they are now at work on the by-wash. Some stone has been dressed for the culvert, the ends of which they intend to build this season.

They have two steam dredges at work at the upper end of section No. 7, and are excavating on the south side above water level, and forming a new road to take the place of the old one now being removed.

#### *Section No. 8.*

The work on this section consists in widening and deepening the prism of the present canal, forming a berm bank and road on the south east side, and lining the inside slopes with stone pitching or rip-rap, &c. The Contractors are Messrs O'Brien, Sullivan & Co.

On the 10th of July excavation above surface water was commenced on the south east side, at the upper end of the section, where the material removed was deposited in spoil in rear of the berm bank. The excavation was continued downwards on this side of the canal until November. The material removed was utilized in forming the berm bank, and the public road where it follows the line of canal.

Two dredges commenced work on 20th September at about the middle of the section; one of them was removed from the work in the beginning of November, the other continued at work until the close of the season. The progress made by these dredges was not satisfactory, owing principally to delay in disposing of the excavated material, caused by want of proper appliances for handling it. During the month of November a small amount of excavation was done on the north bank above water line.

When the water in the canal was shut off, earth excavation was commenced upon the bottom and sides, with a large force, which was gradually increased until as many men were employed as could be worked to advantage. Rock excavation in the prism was also commenced and continued until the end of April, when the water was let in.

As soon as the foundations could be prepared, the slope walls were commenced on both sides of the canal, but, owing to the lateness of the season when this work was begun, to the delays caused by flooding of foundation pits, and to a scarcity of suitable stone, little progress was made.

It was found necessary before the water was let into the canal to protect the banks with loose stone in the form of rip-rap. The bottom was also well cleared, all obstructions removed, and the towing path put in a proper state of repair.

Since the opening of navigation, some dredging has been done, and some small culvert masonry built under the road and south bank. Soon after the canal was filled in May a large quantity of water filtered through the north bank at the upper end of the section, which flooded some of the swamp lands and passed off in the little River St. Pierre; an effort was at once made to staunch the flow by lining the face of the bank with puddle, which was only attended with partial success. Special attention should be given to this matter before opening of navigation in May next.

#### *Section No. 9.*

This section includes the principal part of what is known as the "rock cut," and the work upon it consists in widening and deepening the present canal, and forming new towing path and berm bank, side and cross drains, &c. The Contractors are Messrs John Lyons & Co.

At the close of the last fiscal year the heaviest portion of the excavation above surface water was completed. During the summer the force was greatly reduced, and little work was done until towards the close of the season, when a considerable amount of rock above water was removed on both sides of the canal, and the remaining earth work above water was nearly completed. Some stone drains required on the south bank were built, and the old ones repaired.

Preparations for the winter's work were also made. Several steam drills had been at work since July, and the drilling for enlarging the canal was well advanced before the water was drawn off at the close of navigation.

After the water was shut out of the canal, the coffer dams built and the bottom properly unwatered, the excavation below surface water, in both earth and rock was resumed, and continued during the winter season, when a large amount of each class of excavation was done, and the side slopes through the earth cutting protected with dry walls. The foundation of these walls was for some distance in quick sand, and great difficulty was experienced in getting a suitable foundation. In March the section was flooded which caused about two weeks' delay.

Before the water was let into the canal, the bottom and top banks were cleared up, and those parts of the earth slopes where the wall had not been completed, protected with rip-rap.

No work has been done on this section since the opening of navigation.

#### *Section No. 10.*

This section lies to the south of the Guard Lock and Weir at Lachine, and is 1,400 feet in length. It includes all the works connected with the formation of a new channel, for its whole length, the construction of a new guard lock, abutments and turn-table for a swing bridge, retaining walls, &c. Contractors, Messrs Rodgers, Kelly & Co.

Work on this section has been carried on steadily throughout the year. To guard against leakage from the weir and river, a puddle wall was formed across the head and along the north side of the lock pit. The earth excavation is about finished.

Rock excavation in the lock pit is nearly all out, and on the section is excavated to nearly the full depth and width, except about 300 feet at lower end which forms a dam between the old and new works. The embankment in the river has been carried to a distance of 2,340 feet from the shore. A stone drain for carrying the surface water was also built on the south side of the lock.

The rock found at grade in the lock pit being unsuitable for a foundation, it was decided to put in one of timber and plank for the whole extent of the lock walls. Timber for this purpose, as well as oak timber for mitre sills is being delivered.

The quarry opened at Ste. Geneviève last year has been abandoned. Some stone has been got out at Grande Ligne near St. Johns, and stone is now being received from Isle au Motte on Lake Champlain, and cut on the section.

A large quantity of stone has been delivered and prepared for the lock, and arrangements made for building the lock masonry as soon as the foundation is prepared for it.

#### *Section No. 11.*

The work on this contract consists of the construction of a new entrance channel and harbor at Lachine on the south east side of the present entrance. It is to be formed by a line of pier work about 6,200 feet in length, with a stone superstructure faced with a wall of rubble masonry, protected by an ice breaker of timber at the upper end. Messrs Wm. Davis & Sons are the Contractors.

During the early part of the fiscal year a large quantity of timber, lumber and iron was delivered, and some timber framed. In August a steam dredge was employed clearing the site for the coffer dam outside of the present pier. The first crib on this line was commenced on the 18th August, and the framing and sinking of cribs was continued until October.

The double or outside line of crib-work was then commenced, and a few cribs sunk, but so much difficulty was found in clearing the bottom that work was suspended here and resumed in rear of the present pier, and carried on until January 13th, when it was stopped by the severity of the weather.

No further work was done during the winter except delivery of stone for crib filling.

On June 2nd work was resumed upon the double crib work and has been continued without interruption. On this line forty cribs have now been sunk in position, which is equal to about six hundred feet in line of pier.

In the line of coffer-dam adjoining present pier twenty-eight cribs have been sunk, making ten hundred and sixty feet in length of dam.

A large quantity of timber and iron has been delivered for this section since the opening of navigation.

#### *BEAUFORT CANAL.*

This canal was closed on the 29th of November 1876, and re-opened on the 5th of May 1877, being a navigable season of 209 days, during which time no interruption to the trade occurred.

The lower gates of Locks No. 7, 10, 11 and 12, and the upper gates of No. 12 were taken out, repaired and replaced, and hung by suspension gear.

The knee quoins of lower gates and of one upper gate of Lock No. 8, and of the lower gates of No. 13 were renewed and the foot bridges repaired.

Seven pairs of damaged gates were hauled out and taken apart, and five pairs of them rebuilt.

One new bumping post was put up at each of the Locks Nos. 6, 9, 12 and 14.

A new chamber and valve rod were put on one of the upper gates of Lock No. 6; one new chamber, and two oak mullions were placed on the lower gates of Lock No. 14, and a new chamber on one of the lower gates of Lock No. 10.

When the water was drawn off in the spring, it was discovered that the puddle had been washed out from under the foundation at Lock No. 12, from the lower mitre sill platform downwards to the lower end of the apron. This was remedied by filling up with puddle and concrete, and replanking the bottom.

A large hole was also found between the walls, below the lower mitre sill of Lock No. 13, where a crib of 40 feet by 16 feet was sunk, filled with stones, and planked on top.

The walls forming the upper approach on north side of Lock No. 7, and those on south side of Locks Nos. 6, 7, 8, 9 and 13, were partially taken down and rebuilt, and portions of the lock masonry pointed.

The sluice gates of Regulating Weir's, at Locks Nos. 9, 11, 12 and 13, were furnished with new rods and blocks.

A new crab winch was placed at Lock No. 6, and one at No. 8, and an old one repaired at Lock No. 14.

The swing bridges at Locks Nos. 8, 9, 11, 13, 14 and St. Timothy, received such repairs as were necessary, and timber for a new swing bridge was prepared.

The bridge over the raceway, from weir at St. Timothy, and six farm bridges over side ditches were rebuilt, and at Lock No. 10 the long bridge over the waste weir was partially replanked.

All the dwelling houses of Lock masters and Lock laborers, as well as the house and office of the Collector, have been kept in good repair.

The foundation of a building 66' x 24', has been built at Lock No. 7, which is intended as dwellings for two Lockmen and the Bridge-keeper at that lock.

A shed 80' x 18' for the protection of prepared timber and lumber, and a small store-house for cement, lime, &c., have been built.

The Dyke at Hungry Bay has been raised 15 inches, for a length of 250 yards, and 47 toises of stone drawn to raise the protection walls on the outside.

The banks and slope walls of canal, on both sides, were repaired before the water was let in this spring, as well as the public roads where they front on canal lands, and all race-ways, culverts, ditches, &c., thoroughly cleaned.

Very few spare gates are on hand, and it would be advisable to have a few more constructed, so as to be prepared in case of accident.

#### CHAMBLY CANAL.

Navigation was closed on this canal on the 28th November, 1876, and re-opened on the 1st May, 1877, during which open period of 212 days there was no interruption to the trade.

All the structures, banks, towing paths, &c., were maintained in good working order, throughout the fiscal year. During the winter, a spare swing-bridge was framed and preparations made for general repairs in the spring.

In April a pair of spare gates, built last autumn, were inserted at Lock No. 6, and the mitre sills at this lock, and Lock No. 8, repaired. New sluice gate frames were placed in upper gates of Lock No. 2, and the lower gates of Lock No. 3 repaired.

New fenders were placed at Locks Nos. 2, 3, 4 and 6, and a new balance beam at Lock No. 9.

Bridges Nos. 1, 3, 5 and 6 were repaired, and fitted with new fenders. The wing wall on the west side at Bridge No. 3 was rebuilt with timber, and No. 6 was replanked.

The By-wash at Fryer's received a new bottom and other repairs, and a leak was stopped at Wood's By-wash.

The By-wash between Locks Nos. 4 and 5 was rebuilt, and the weir below No. 6 was replanked.

The banks, towing paths, slope walls, wharves, fences, &c., were also thoroughly repaired, and side ditches cleaned.

The houses of the Lock masters and Bridge keepers, were kept in good repair, and new kitchens built at the houses of Locks Nos. 7 and 9.

#### RIVER RICHELIEU IMPROVEMENT.

Steam Dredge No. 1, was employed on the River Richelieu, from the 1st July 1876, until the 15th of November, when she was removed to the Lachine Canal

where she lay all winter, and was refitted this spring. She resumed operations in the River Richelieu on the 25th of May, and continued work until the end of the year.

The Dredge and two dumping scows were thoroughly repaired in April and May, and are in good order.

Satisfactory progress has been made, and a channel 100 feet in width by 7 feet in depth, at low water, formed between St. Ours Lock and Belœil, except at St. Antoine, where the dredge was employed at the close of the year. It is expected this work will be fully completed during the present season.

#### ST. OURS LOCK AND DAM.

The guide piers at upper approach to this lock were repaired and two mooring posts renewed.

In August, the valves of three of the lock-gates, were taken out, repaired and reinserted.

At the dam, some of the plank sheeting was renewed, the cribs underneath having been previously filled with stone.

In March the ice was sawn at lower end of lock, and the gates freed, to prevent damage.

The Superintendent's house was repaired, as well as the fencing of his grounds.

Navigation was closed by ice on 20th of November 1876, and opened on 10th April 1877. While the valves were being repaired in August the traffic was interrupted as follows:—On the 10th for 13½ hours, on the 11th for three hours, and on the 17th nine hours, making a total of 25½ hours.

#### ST. ANNE'S LOCK AND DAM.

The navigation at this point was closed by ice on 29th November 1876, and opened on 21st April 1877, being an open season of 223 days, without interruption of any kind.

The work done here during the fiscal year has been very light, consisting chiefly of temporary works necessary for the maintenance of the navigation, and repairing the damages caused by the extreme high water of 1876, replacing buoys etc.

#### NEW WORKS.

The new work consists in the formation of a canal across the shoal below the lock, connecting with deep water along the north shore of Isle Perrot. When completed it will be about 1200 feet in length, by 120 feet wide, with a depth of ten and one half feet at low water, supported at the sides with an embankment and with crib work.

The season for operations last year was very short, as the unwatering of the works was not completed until the 1st of August, owing to the unusual high water. After that date the season was favorable, and the work progressed in a satisfactory manner until the 30th November, when the ice took, and the work was suspended.

During the month of November the upper ends of the piers were finished and protected by a sheathing of 4 inch tamarac plank banded with wrought iron straps.

No work was done during the winter. On the 17th June the Contractor resumed operations, and the work is now progressing favorably with every prospect of being completed before the close of the season.

A dredge is now being prepared to do the excavation required in the approaches.

#### CARILLON CANAL.

*Locks Nos. 1, 2, and 3.*—The repairs made to these locks, during the year, have been of the usual nature. On the 18th November last a portion of the face stones, in the recess wall, on the north side of Lock No. 2 was forced out by compressed air from

the water sluiceway in the wall. It was temporarily repaired with plank, and before the opening of navigation this spring, was rebuilt with masonry, which was again displaced on the 5th of May.

It was then found necessary to close the sluice, and pass the water through sluices in the gate.

The gates and sluices have been repaired, the lock walls pointed, and sills grouted. The canal banks, fences, buildings, and towing path were kept in good order, and prism of canal cleaned, before opening of navigation this spring.

A large expenditure was made in maintaining the North River Dams and Feeder during the year. It is found to be very difficult, keeping a sufficient supply of water for the Carillon Canal at all seasons, owing to the leakage through the old lock walls and the decrease in volume of the water in the North River during midsummer.

#### CHUTE A BLONDEAU.

Lock walls, gates, and sluices have been repaired, and the upper entrance to canal and lock cleaned. Vessels of ordinary draft have much difficulty in passing through the canal during low water.

#### NEW WORKS.

The works at this point are intended to supersede the Carillon and Chute à Blondeau Canals. They consist of a flat dam about 1800 feet long, across the River Ottawa in the Rapids, a short distance above Carillon village, a timber slide 600 feet long by 120 feet wide on the south side of the river, and a canal three quarters of a mile long including two locks, and their approaches on the north side.

#### CANAL AND LOCKS.

On the 11th July 1876, work was resumed on the retaining wall along the inside slope of canal embankment, and by the middle of August, the upper portion of the canal, including pit of Lock No. 2, had been unwatered; trestle work for travelling derricks was again erected, and the foundation of the lock which had been prepared the previous season, cleaned and got ready for the masonry.

The first stone for the season was laid on 7th September, and fair progress made afterwards until 17th November, when the fifth course, a height of seven feet ten inches, had been laid.

It was resumed in April, but stopped again about the middle of May for want of stone, and nothing has been done since. The south wall was then eleven feet four inches high, and the north wall, about nine feet eight inches.

Work on the river embankment, and toe crib was recommenced at the latter end of July 1876. About 1,300 lineal feet of the toe crib was built, making a total length now laid of 3,330 feet. The embankment was carried on until stopped by frost. A few days work only were done this season.

The rock excavation in the prism between the two locks, was also nearly completed. About 4,530 cubic yards of rock were removed, 2,340 cubic yards of puddling done, and 33,000 cubic yards of earth from borrowing pits placed in embankments.

At Isle Bizard, quarrying stone for this work was carried on until the middle of March, and about 1,800 cubic yards of stone are now lying there, of which 470 cubic yards are dressed for the lock walls.

#### DAM.

Work was not resumed till the end of August, and after that, proceeded slowly till the close of the season. The temporary bridges were run out from both sides of the river and three cribs for foundation of skeleton bulkhead placed in position, two of these, however, were only to replace others which had been carried away by ice, &c.



At the dam proper, that portion between the slide piers, previously built, had the covering put on; the foundation was laid between the slide pier and south shore, and a short piece, in shallow water, between the north and "Sickle" channels. Three foundation cribs were also placed in deep water, one in the north channel, being the last required there, one in a deep place, between that and the "Sickle" channel, and another in the north side of the "Sickle" channel.

The length of foundation of dam laid during the season, was 364 feet, 82 feet of which was in deep water. About 500 feet in length of the deep water foundation still remains to be laid, which might easily have been done last fall, if proper advantage had been taken of the unusually low water and fine weather.

#### SLIDE.

Work was recommenced here in September. The foundations of both piers were completed, and the piers built up to a safe height before winter set in, and during the winter, they were both carried up nearly to the intended height and well filled with stone.

Nothing whatever has been done on any of these works since the middle of May, although the season has been in every way favorable.

When the water had fallen last season, an inspection was made, and it was found that two or three more of the temporary cribs for skeleton bulkhead, had been carried away, and that the permanent work had sustained no serious damage, except that the sills laid in 1874 are worn and rounded on top by the abrasion of ice, timber, &c., passing down the river.

So far as can be seen at present, it does not appear that any damage whatever has been done to the works, by ice or high water last Spring; but a small quantity of the timber stored above Carillon was carried away and lost.

The present Carillon and Chute à Blondeau Canals, are now in such a dilapidated state, that the early completion of the new works has become a matter of necessity; otherwise a large expenditure will necessarily have to be made in rebuilding the old locks, which are now actually failing, or the navigation over this route suspended, until the new works are finished.

#### GRENVILLE CANAL.

The combined locks Nos. 5 and 6, 7 and 8, at the lower entrance of the canal are in a very dilapidated condition and require continual and extensive repairs.

Before the opening of navigation this season, the walls were pointed and the sills of Nos. 7 and 8 repaired. As the stones of which these sills are formed are crumbling away, it was found necessary to remove some of them, which were replaced with timber, strapped and bolted to the rock foundation.

These locks are in a very unsafe condition and should be rebuilt as recommended in previous reports.

At Lock No. 9 no repairs of any consequence were required to either lock or bridge during the year.

At Lock No. 10, three broken valves were removed and replaced by new ones this spring, and the lock house repaired.

At Lock No. 11, no repairs were required except painting foot bridges of gates, and pointing bridge piers.

The prism of canal between Locks Nos. 6 and 7, and above Lock No. 8, as far as By-wash, was cleaned and retaining walls repaired. The towing path, bridges and fences have been kept in good order, and the buildings repaired.

The improvement made on this canal, by contract for its enlargement, during the past winter, has increased the draft of water afforded for vessels from the entrance at Grenville to Lock No. 8.

No detention to the trade whatever occurred on the Carillon, Chute à Blondeau and Grenville Canals, during the fiscal year.

They were all closed by ice on the 30th November 1876. The Carillon and Châte à Blondeau were re-opened on the 26th April, and the Grenville on the 1st May 1877.

### NEW WORKS OF ENLARGEMENT.

Mr. Goodwin's contract for this work, embraced the completion of this canal from its entrance above Grenville to Lock No. 8, a distance of  $5\frac{3}{10}$  miles.

The bottom width of the enlarged canal, to be 50 feet, above Guard Lock at Grenville, and 40 feet below it, with passing basins; the whole to have a depth of ten feet of water, or one foot below top of mitre sills of the new locks.

The work having been suspended on the opening of navigation in May 1876, was resumed on sections Nos. 2 and 3 in December, immediately after its close.

After the Contractor had completed his arrangements, the force employed during the winter averaged 260 men and 35 horses on section No. 2, and 130 men and 11 horses on section No. 3.

The work done during the season being chiefly excavation and the most of it rock, the drilling was principally done by steam, and the material removed on a tram railway track, laid in the bottom, with inclined planes leading up the bank, on which dumping cars conveyed the excavated material to the spoil bank. The loaded cars were hauled out of the pit by stationary steam engines placed on the bank, which also furnished steam for operating the drills.

#### *Section No. 1.*

No work was done on this section except building a small bridge over the waste weir, above Lock No. 10.

To complete this section according to its contemplated dimensions a large amount of excavation remains to be done.

The prism above Guard Lock, has, for the most part, only a reliable draught of six feet at extreme low water; a large amount of earth and rock must be removed to give it the required width and depth. Below the Guard Lock, there is still about 22,000 cubic yards of material to be removed to complete this reach to a bottom width of 40 feet, and 10 feet draught of water.

#### *Section No. 2.*

A large amount of work was done on this section during the season. It consisted in widening and deepening the whole prism between Dewar's Mill, and upper end of approach to Lock No. 9. The excavation on this portion of the canal is nearly completed. Although the amount of work to be done is small, yet there are several points of rock projecting into the channel from the south side having only four feet of water on them, and an unfinished meeting basin, which has been excavated down to the rock, or about  $3\frac{1}{2}$  feet below water surface.

There are a few points also which require to be deepened about one foot to obtain the full depth of 10 feet.

Between Dewar's mill & Lock No. 10, nothing was done, although it requires to be widened or deepened at several points.

A new waste weir was built on this section, on the south side of the meeting basin at Dewar's mill. It is built of rock faced ashlar masonry, with wing walls of rubble work in front and rear.

#### *Section No. 3.*

The excavation of this Section has been completed to within about 300 feet of the lower approach to Lock No. 9.

The lower part of this section for a distance of 700 feet above Lock No. 8, has been left untouched, its dimensions being sufficiently large for the present navigation

of 6 feet, and when the new enlarged Lock No. 8 is built, the approach to it will probably not follow the present channel of the canal.

A new waste weir has also been built on this section. It is similar to the one built on section No. 2, a short distance above Lock No. 8.

Work on these sections was discontinued early in May. The Engineer has since been employed in preparing the quantities for a "Final Estimate."

#### CULBUTE CANAL.

These works form an addition to the internal navigation of the Upper River Ottawa. They are situated in the North channel, about 100 miles above the City of Ottawa, and when brought into use will open a navigable reach of the River directly between Bryson, at head of Grand Calumet Falls, and Des Joachims at foot of the Rapids of that name, a distance of about 80 miles, and afford access by water to the town of Pembroke.

The works are located in what has been known as L'Islet Rapids, about  $\frac{1}{2}$  mile below the Culbute Rapids, and within three miles of the head of Culbute Channel.

They consist of two combined timber locks, and overcome a fall of 14 feet in low, and 18 feet in high water; they are 200 feet in length between hollow quoins, 45 feet wide at bottom, with 6 feet of water on the mitre sills; and a pier and rolling dam across the head of L'Islet Island and Rapids; the apex of rolling dam being as high as low water in Pembroke Lake, above the Culbute Rapid, and the pier dam across L'Islet and the upper lock walls raised to a height of 3 feet above high water. Necessary guide piers were also built at both entrances.

At the close of the last fiscal year, the locks and their mooring piers and the pier dam on L'Islet, were finished with exception of the top covering, and the foundation cribs and sills of flat dam were well advanced.

In the early part of July the superstructure of the flat dam was commenced. The last foundation crib was sunk on the 12th August, and by the middle of September the whole frame work of the superstructure was finished, leaving only some ballasting, sheeting and gravel filling in front to be done.

This was all finished in October, including the removal of the temporary dam at the Culbute Rapids, so that on the 1st of November, the works under Messrs. Davis & Sons' contract were practically completed.

Soon after the removal of the temporary dam, at the head of the Culbute Rapids, the water flowed over the crest of the flat dam to the depth of ten inches, and the Culbute Rapids had disappeared.

An examination, made a few days afterwards, showed a very direct navigable channel, from the head of the locks upwards to Pembroke Lake and Fort William, with not less than seven feet, at low water on the shoals.

#### LOCK GATES.

This contract embraced the construction of three pairs of lock gates and of one submerged stop gate at the upper entrance, all built of solid timber work.

At the close of the last fiscal year, the stop gate and the lower pair of lock gates had been placed in position. The upper gates were finished and hung in July, and in August, the third or middle pair were placed in position.

The machinery for working the gates, and other fittings were provided and put up, and the lock chambers sufficiently cleaned of the chips and *débris*, to allow of the locks being filled with water on the 11th of November, when the gates and fixtures connected with them were worked and tested.

The locks were also emptied and refilled several times, and the entire works thoroughly inspected, all of which were, and are still staunch and in good working order.

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**CHANNEL BETWEEN BRYSON AND THE LOCKS.**

The water in the channel between Bryson and the Culbute Locks, had fallen below navigable height during the dry season, and the Union Forwarding Company's Steamer when drawing only three feet of water, could not pass the shoals in the Calumet Channel a few miles above Bryson, and was laid up for the season.

An examination and survey has since been made, for the purpose of determining the most feasible and economical mode of keeping the water in this channel up to navigable height, during the season of low water.

A plan for this purpose consisting of dams and stop logs across the river at the head of Calumet and Flat Rapids, has been submitted for approval, and preparations are now being made to place the necessary works under contract.

Another plan for the improvement of the reaches between Des Joachims and the mouth of the Mattawa was also prepared and forwarded to the Department.

I have the honor to be, Sir,  
Your obedient servant,

JOHN G. SIPPELL,  
*Superintending Engineer.*

F. BRAUN, Esq.,  
Secretary, Public Works,  
Ottawa.

## LACHINE CANAL.

STATEMENT showing the depth of river water on the mitre sill of Lock No. 1, at lower entrance, and Lock No. 5 at upper entrance, during the Fiscal Year ended 30th June 1877. (From Lock Master's Returns.)

Months.	Lock No. 1—Lower Sill.		Lock No. 5—Upper Sill.	
	Highest.	Lowest.	Highest.	Lowest.
1876.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
July.....	22 5	19 9	14 1	12 3
August.....	19 8	18 3	12 2	11 2
September.....	18 4	17 9	11 4	10 4
October.....	18 1	17 7	11 1	10 6
November.....	18 4	17 11	11 0	10 8
December.....	34 11	17 9	12 2	10 0
1877.				
January.....	32 4	28 5	12 0	10 2
February.....	30 10	27 9	10 6	9 1
March.....	29 10	27 3	11 0	9 11
April.....	31 4	21 0	12 7	10 11
May.....	21 3	19 3	12 10	11 8
June.....	19 3	18 2	11 9	10 10

## BEAUHARNOIS CANAL.

STATEMENT showing the depth of river water on the mitre sill of Lock No. 6 at lower entrance, and Lock No. 14 at upper entrance, during the Fiscal Year ended 30th June 1877. (From Lock Master's Returns.)

Months.	Lock No. 6—Lower Sill.		Lock No. 14—Upper Sill,	
	Highest.	Lowest.	Highest.	Lowest.
1876.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
July.....	14 0	12 2	13 9	13 0
August.....	12 2	11 4	13 2	12 8
September.....	11 4	10 9	12 11	12 0
October.....	10 9	10 6	12 11	12 1
November.....	10 10	10 7	12 4	11 11
December.....	15 6	10 2	13 2	11 11
1877.				
January.....	21 0	10 8	13 0	11 11
February.....	15 0	12 6	12 0	11 8
March.....	12 6	11 5	12 0	11 7
April.....	12 4	11 6	12 7	12 0
May.....	12 4	11 4	12 5	12 0
June.....	11 4	10 9	12 0	11 9

## CHAMBLY CANAL.

STATEMENT showing the depths of river water on the mitre sills of Lock No. 9, at lower entrance, and Lock No. 1, at upper entrance, during the Fiscal Year ended 30th June, 1877. (From Lock Master's Returns.)

Months.	Lower Sill.		Upper Sill.	
	Highest.	Lowest.	Highest.	Lowest.
1876.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
July.....	12 5	10 0	9 9	8 5
August.....	10 0	8 6	8 9	7 0
September.....	8 6	8 4	8 0	7 4
October.....	8 7	7 7	8 4	7 0
November.....	8 6	7 9	7 6	7 0
December.....	8 0	7 3	7 5	7 0
1877.				
January.....	8 7	7 6	7 5	7 0
February.....	9 2	8 2	7 5	7 0
March.....	16 6	8 3	9 7	7 2
April.....	17 10	14 2	10 8	9 8
May.....	14 6	11 6	10 6	9 4
June.....	11 3	9 4	9 6	8 0

## ST. OURS LOCK AND DAM.

STATEMENT showing the depth of river water on the mitre sills of the St. Ours Lock, during the Fiscal Year ended 30th June 1877. (From Superintendent's Returns.)

Months.	Lower Sill.		Upper Sill.	
	Highest.	Lowest.	Highest.	Lowest.
1876.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
July.....	14 0	10 3	10 6	8 11
August.....	10 3	8 4	8 11	8 0
September.....	10 0	7 9	8 3	7 9
October.....	9 1	8 1	8 2	7 6
November.....	10 0	8 3	8 5	7 6
December.....	13 7	8 2	8 11	7 4
1877.				
January.....	13 6	11 5	8 11	7 8
February.....	13 11	12 5	9 3	7 11
March.....	17 1	12 8	12 10	8 1
April.....	19 9	14 4	15 8	11 5
May.....	14 7	10 11	11 10	9 10
June.....	10 9	9 0	9 9	8 5

## ST. ANNE'S LOCK AND DAM.

STATEMENT shewing the depth of river water on the mitre sills of the St. Anne's Lock, during the Fiscal Year ended 30th June 1877. (From Superintendent's Returns.)

Months.	Lower Sill.		Upper Sill.	
	Highest.	Lowest.	Highest.	Lowest.
1876.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
July.....	11 6	9 5	12 5	19 3
August.....	9 5	8 5	9 1	7 6
September.....	8 6	7 11	8 2	6 1
October.....	8 3	7 8	7 7	6 10
November.....	8 4	7 11	8 7	7 7
December.....	9 8	8 0	8 4	7 4
1876.				
January.....	9 8	8 1	8 5	7 0
February.....	8 4	7 3	8 0	7 0
March.....	11 2	7 2	7 6	7 0
April.....	10 1	8 5	11 0	7 7
May.....	10 3	9 2	11 3	9 10
June.....	9 2	8 4	9 10	8 9

## CARILLON CANAL.

STATEMENT showing the depth of river water on the mitre sill of Lock No. 1, at lower entrance, and Lock No. 3, at upper entrance, during the Fiscal Year ended 30th June, 1877. (From Lock Master's Returns.)

Months.	Lock No. 1—Lower Sill.		Lock No. 3—Upper Sill.	
	Highest.	Lowest.	Highest.	Lowest.
1876.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
July.....	12 6	8 10	13 3	8 5
August.....	8 9	6 10	8 4	5 10
September.....	6 9	5 11	5 10	4 11
October.....	7 0	6 0	6 3	5 0
November.....	8 1	7 2	7 10	6 5
December.....	8 5	7 6	8 6	7 5
1877.				
January.....	8 10	8 3	9 5	7 6
February.....	8 3	6 7	7 3	6 1
March.....	7 2	6 6	6 9	6 0
April.....	11 0	7 4	11 9	7 0
May.....	10 11	9 8	11 9	10 0
June.....	9 8	8 4	9 11	8 0

## CHUTE A BLONDEAU CANAL.

STATEMENT showing the depth of river water on the lower and upper mitre sills of Lock No. 4, at Chûte à Blondeau, during the Fiscal Year ended 30th June, 1877. (From Lock Master's Returns.)

Months.	Lower Sill.		Upper Sill.	
	Highest.	Lowest.	Highest.	Lowest.
1876.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
July .....	14 6	9 9	14 2	9 6
August .....	9 6	6 6	9 4	6 7
September .....	6 7	5 6	6 7	5 7
October .....	7 0	5 7	6 10	5 8
November .....	8 6	7 0	8 5	6 11
December .....	14 3	8 1	13 0	8 0
1877.				
January .....	19 2	13 3	18 9	13 5
February .....	16 0	7 0	17 6	9 6
March .....	8 10	4 10	9 6	4 8
April .....	12 9	5 3	12 6	5 0
May .....	12 9	10 10	12 6	10 9
June .....	10 9	8 7	10 8	8 6

## GRENVILLE CANAL.

STATEMENT showing the depth of river water on the mitre sills of Lock No. 5, at lower entrance, and Lock No. 11, at upper entrance, during the Fiscal Year ended 30th June, 1877. (From Lock Master's Returns.)

Months.	Lock No. 5—Lower Sill.		Lock No. 11—Upper Sill.	
	Highest.	Lowest.	Highest.	Lowest.
1876.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
July .....	14 3	10 4	19 6	14 10
August .....	10 2	7 0	14 4	11 1
September .....	6 11	6 1	11 1	9 10
October .....	7 4	6 1	11 8	9 9
November .....	8 9	7 6	13 8	11 11
December .....	15 6	8 3	12 10	11 8
1877.				
January .....	19 6	15 9	11 8	10 4
February .....	17 6	8 0	10 4	9 11
March .....	8 0	6 0	10 10	9 9
April .....	12 9	8 6	17 9	11 1
May .....	12 8	11 1	17 9	16 3
June .....	10 10	9 0	16 2	14 0



## LACHINE CANAL.

STATEMENT of Fines and Damages collected during the Fiscal Year ended  
30th June, 1877.

Date.	Name of Vessel.	Name of Owner.	Fines.	Damages.	Totals.
1876.			\$ cts.	\$ cts.	
July 17	Steam Barge Adventure.....	M. Delanay.....		300 00	to B. Canal.
21	Barge Caroline .....	H. Paquin.....	20 00		
22	Steamer Passport .....	R. and O. Navigation Co..		1,200 00	to B. Canal.
26	Barge Protecteur.....	F. X. Lambert.....		4 00	
Aug. 9	Propeller Calabria .....	D. Butters & Co.....	4 00		
19	Barge Ernest.....	Lough & Co.....	10 00		
21	Propeller Georgiana.....	J. Burgess.....	40 00		
Sept. 16	Lot of Lumber.....	F. McNamee.....	10 00		
Oct. 6	Raft.....	Wm. Grier.....	10 00		
16	Barge Powerful.....	McPhee & Co.....	20 00		
		Total.....	150 00	1,504 00	1,654 00

M. C. CONWAY,  
*Superintendent.*

LACHINE CANAL OFFICE,  
MONTREAL, July, 1877.

## LACHINE CANAL.

STATEMENT of amounts collected for Wood Rent and Wintering Vessels  
during the Fiscal Year ended 30th June, 1877.

Items.	No. of Cords.	Rates.	Amounts.
Firewood.....	20,452	4	\$818 08
Wintering Vessels.....	82		341 75
Total.....			\$1,159 83

JOHN O'NEIL,  
*Collector Canal Tolls.*

COLLECTOR'S OFFICE,  
MONTREAL, July, 1877.

## LACHINE CANAL

STATEMENT of Basin, Firewood, Fines and Bank dues, collected at Lachine  
for the Fiscal Year ended 30th June, 1877.

Date.	Items.	Amounts.	Remarks.
1876-77.		\$ cts.	
	Basin dues.....	245 77	
	Firewood dues.....	68 10	
	Bank ".....	48 00	
	Fines ".....	10 00	
	Total.....	371 87	

JOHN DYDE,  
*Collector.*

COLLECTOR'S OFFICE,  
LACHINE, July 1877.

## BEAUHARNOIS CANAL.

STATEMENT of amounts collected for Fines and Damages, for the  
Fiscal Year ended 30th June, 1877.

Date.	Name of Vessel.	Master or Owner.	Fines.	Damages.	Totals.
1876.			\$ cts.	\$ cts.	\$ cts.
July 4	Propeller Argyle.....	Captain McLaughlin.....	20 00		
19	" Columbia.....	" Zealand.....	20 00		
19	Steamer Spartan.....	" Bailey.....		75 00	
27	" ".....	" ".....		12 00	
Aug. 10	Propeller Zealand.....	" Zealand.....		25 00	
Sept. 2	" Persia.....	" Vaughan.....		10 00	
Oct. 12	Barge Iroquois.....	" St. Marseille.....	5 00		
16	Propeller Lake Erie.....	" Aumond.....	10 00		
Nov. 2	Raft.....	" Leslie.....	10 00		
9	Prop. F. Russell, of Quebec		20 00		
16	Schooner Alice Mary.....	Captain R. William.....	10 00	20 00	
1877.					
April 2	G. Martineau & J. Peterfin.....		2 00		
June 11	Propeller Cuba.....			5 00	
		Totals.....	\$97 00	\$147 00	\$244 00

J. F. BÉIQUE,  
*Superintendent.*

BEAUHARNOIS CANAL OFFICE,  
MELOCHEVILLE, 1st July, 1877.

## CHAMBLY CANAL.

STATEMENT of amounts collected for Fines and Damages, &c., for the Fiscal  
Year ended 30th June, 1877.

Date.	Name of Vessel.	Master or Owner.	Amount.	Remarks.
1876.			\$ cts.	
July .....	B G. H. Bramley.....	Capt. N. Dubuc.....	3 00	
	" M. L. Rockwell.....	" J. J. Rockwell.....	5 00	
	" J. O. Turner.....	" M. Lynch. ....	1 00	
August 1.....	" L. C. Allard.....	" L. Blais.....	15 00	
7.....	" G. H. Burrough.....	" W. Lavallée.....	40 00	
	Wharfage.....		4 40	
			68 40	

LS. OUIMET,  
*Superintendent.*

CHAMBLY CANAL OFFICE,  
CHAMBLY, July, 1877.

## APPENDIX No. 4.

## CORNWALL CANAL.

CORNWALL, 3rd July, 1877.

SIR,—I have the honor to report on the Cornwall Canal for the fiscal year ended 30th June, 1877.

The canal was kept in good working order from 1st July 1876 to the 8th December following, when it was closed for the winter months. It was opened again on the 26th May 1877, and has continued in good working order to the 30th June.

The works in progress during the year may be classed under the head of ordinary repairs, as follows:

Rebuilding lower gates of Lock No. 17. General repairs to lock gates in use, to waste weirs and bridges, making five new lock gate foot bridges, six new lock gate knees, ten new sheaves, raising slope walls, opening ditches and cleaning drains leading through culverts, &c.

The canal closed on the 8th of December 1876. Opened for navigation on the 26th of April 1877.

I have the honor to be, Sir,  
Your obedient servant,

D. A. McDONELL,  
*Superintendent.*

F. BRAUN, Esq., Secretary,  
Department of Public Works,  
Ottawa.

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## APPENDIX No. 5.

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### WILLIAMSBURGH CANALS.

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MORRISBURG, 25th July, 1877.

SIR,—I have the honor to report on the Williamsburgh Canals for the fiscal year ended 30th June, 1877.

These canals were opened on the 1st May, and continued open without any interruption of the navigation until the 5th December, 1876. They were reopened on the 1st May, 1877.

#### *Farran's Point Canal.*

The lower gates at Lock No. 22 were taken out and rebuilt during the winter. The pier at the foot of canal requires repair. The stoning for protection of banks was completed last fall, and, with some further repairs to banks, this canal can be kept in good order.

#### *Rapid Plat Canal.*

The repairs on this canal consisted principally in stone protection to banks with some slight work to locks and gates. Snubbing posts have been placed on the north bank of the canal near Lock No. 23. The gates at Lock No. 24 require repair and some further protection to the banks is required: otherwise this canal is in a good state.

#### *Iroquois Junction and Galops Canal.*

The upper gates at Lock No. 27, Galops, were taken out and rebuilt during the winter. The lower gates at this lock as well as the lower gates at Lock No. 25, Iroquois, should be repaired.

The pier or dock at the foot of the canal at Iroquois was rebuilt during the last season, and the booms and banks have been kept in good order. Timber was got out for rebuilding the portion of the pier at the head of the Galops carried away some years ago. The rebuilding of this and the portion carried away by ice this spring should be proceeded with and completed before the low water this fall.

I have the honor to be, Sir,  
Your obedient servant,

A. G. MACDONELL,  
*Superintendent.*

F. BRAUN, Esq., Secretary,  
Department of Public Works,  
Ottawa.

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## APPENDIX No. 6.

### WELLAND CANAL.

SUPERINTENDENT'S OFFICE,  
ST. CATHARINES July 31, 1877.

SIR,—I have the honor to report on the working and condition of the Welland Canal for the fiscal year ended 30th June, 1877.

The canal was closed on the 15th day of December, 1876, and opened on the 17th day of April, 1877.

There has been but one serious accident on the canal during the year, by which navigation was interrupted for about 27 hours.

On the 18th day of June the schooner "Sea Gull" carried away the head gates of Lock No. 21, at about 5 o'clock a. m.

The break was repaired and navigation resumed at 7.30 a.m. the next day.

The water supply has been very good during the year, by which the mills on the Feeder and Summit Level have been enabled to run a full average of time as compared with former seasons.

The traffic through the canal, though still light, shews a considerable improvement over last year, the number of lockages at Lock No. 3 having been, up to the 30th June from the opening of navigation the present season, 276 more than for last year during the same period, and 526 more than for the same period of 1875.

I append a statement showing the greatest and least depth of water on the mitre sills at Port Colborne and Port Dalhousie locks in each month during the year, also a comparative statement shewing the average depth for the months of June 1876 and 1877, by which it will be seen that the water has been lower this year for June 1 foot 10 inches at Port Dalhousie, and 1 foot 5 inches at Port Colborne.

I have collected in fines and damages from the owners of vessels violating the Canal regulations the sum of \$355.11 which I have deposited in the Imperial Bank of Canada here, to the credit of the Minister of Inland Revenue, a statement of which is appended to this report.

New works and repairs during the year are as follows:—

#### DIVISION No. 1.

At Port Dalhousie, light house and crib repaired after fire.

#### Lock No. 1.

New head gate heel path side. Top of waste weir renewed, swing bridge repaired, new stationary bridge at Weaver's point.

#### Lock No. 2.

Addition to watch house. Roof to double lock house renewed, and inside of both houses generally repaired. painted, &c.

#### St. Catharines Swing-bridge.

New pivot beam. Repairs to watch house.

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*Lock No. 3.*

Repairs to watch-house. Approach planked.

*Lock No. 4.*

Floating tow path repaired, float bridge replanked, traps and cribs to same repaired. Two kitchens to lock-tenders' houses built and fence repaired.

*Lock No. 5.*

Two stationary bridges replanked, lock and swing-bridge repaired.

*Lock No. 6.*

Lock-tender's house repaired.

*Lock No. 7.*

Swing-bridge and floats repaired.

*Lock No. 8.*

Floats repaired.

*Lock No. 9.*

Float replanked.

*Lock No. 10.*

Floats repaired, aprons renewed and lock-tender's house repaired.

*Lock No. 11.*

Floats and lock-tender's houses repaired. One new bridge built over hydraulic race and one repaired and aqueduct caulked.

*Lock No. 12.*

Lock shanty and floats repaired.

*Lock No. 13.*

Floats repaired.

*Lock No. 14.*

Lock shanty and floats repaired.

*Lock No. 15.*

Swing-bridge and floats repaired and drain opened.

*Lock No. 16.*

Stone wall on heel path built.

*Lock No. 17.*

Float replanked and crib rebuilt, lock-tender's house repaired and fence built.

*Lock No. 18.*

Stone wall to hold bank built and floats repaired.

*Lock No. 19.*

Stone wall built to hold bank. New kitchen built. Railing to protect public against accident at quarry put up, and lock-tender's lot fenced. New top to waste weir. Gravel scow and lifting scow repaired on dry dock, caulked and new painted, and new windlass put on lifting scow.

*Gate yard.*

Two high lift gates built and laid away in reserve behind Lock No. 14, and two ditto behind Lock No. 21.

Two low lift gates, one for No. 24, and one in reserve at Lock No. 21. Two ditto for Lock No. 1, and anchored in reserve below locks. Two ditto for Port Maitland. Two ditto Port Robinson in reserve in Chippewa Creek. Two ditto rebuilt and in reserve in Canal. 50 wheelbarrows repaired. 18 new scoops made. 50 new snubbing posts prepared.

Ordinary repairs over whole division, including cleaning canal and locks in spring, and replacement of all articles wearing out, such as wrists to valves, screws, bolts, castings, snubbing posts, bands, face plates, mitre sill plates, fender planks, crab chains, sheave blocks, crab blocks, bridge plank, repairing banks, &c., &c. Over 50 scow loads of earth and gravel have been used in repairing banks on this division during the year.

*DIVISION No. 2.**Lock No. 20.*

Lock-tender's house repaired.

*Lock No. 21.*

Two new gates and three new anchor irons. Wall to lock-tender's house repaired.

*Lock No. 24.*

New stationary bridge over waste weir, bridge over old race removed, swing-bridge repaired, new approaches made to same, cement and stone retaining wall built on heel path side next mills and store house.

*Lock No. 26.*

Lock-house grounds fenced.

At the foot of Port Robinson Lock, piles were driven, capped and braced, and filled in behind with stone and clay to repair damage to bank by water and to prevent further wash. Canal was cleaned in spring and general and thorough repairs to lock-gates, mitre sills, &c., &c., were made on this division. The banks have been generally repaired by filling where they had been washed away, and a large quantity of stone and gravel has been used in filling the same.

*DIVISION No. 3.*

From the Junction to Port Colborne.

Stone bridge repaired and replanked, floats from Raney's Bend to Port Colborne repaired. Repairs made to mitre sills of Port Colborne Lock by diver.



West pier Port Colborne has had considerable repairs by way of new planking in places and renewing some portions of waling. Ferry boat repaired and ferry ho use moved. Some dredging at head gates of lock has also been done. Back ditch has been cleaned out on west side for about two miles and some portions of same through village well covered with stone.

#### DIVISION No. 4.

From Junction to Dunnville and Port Maitland.

##### *Dunnville Guard Lock.*

One new head gate. Piles on north side of lock capped and cross-braced and covered with plank, constituting a landing wharf 220 ft. long by 14 ft. wide.

##### *Upper waste weir.*

A new bridge built over this weir and general repairs made thereto.

##### *Third waste weir.*

Wing wall extended to protect mill race, a portion of planking on bridge renewed. Embankment at toll bridge repaired with stone and gravel and east side faced with rubble stone. Culverts have been kept clean and back ditch cleaned out where required. Port Maitland Lock cleaned out and two new gates put in, 20 new snubbing posts put in. One new sluice made through bank.

Between Stromness and Marshville the banks of feeder have been raised in many places. The back ditch having been filled up in places with dump earth from dredging, the same has been cleaned out and one mile of new ditch dug where it was found to be cheaper than to clean out the old.

Marshville swing-bridge repaired and banks below faced with gravel for one mile.

Lock-houses and shanties on this division repaired.

In accordance with the permission given in your letter No. 35002 of the 24th day of April 1876, I have placed in the Allanburg Lock (No. 26) one of "Bodwell and Scott's lock gate mitre locks" and find it works easily and answers well the purposes for which it is designed, having been tested at least on one occasion by a vessel not properly snubbed, running against the gates with such force, as in the opinion of the lockmaster, would have certainly carried away the gates and produced a serious disaster, but for the presence of the "Mitre Lock."

I have had the Canada thistles cut on the property of the Department connected with the canal and feeder, and shall extend this service to land required for the new canal the present summer.

On the whole the canal is in a good state of repair and is working satisfactorily

I have the honor to be, Sir,  
Your obedient servant,

E. V. BODWELL,  
*Superintendent.*

F. BRAUN, Esq., Secretary,  
Department of Public Works.  
Ottawa

## WELLAND CANAL.

## STATEMENT of Fines and Damages collected during the Fiscal Year ended 30th June, 1877.

Name of Vessel.	Fines.	Damages.	Total.
	\$ cts.	\$ cts.	\$ cts.
Propeller America .....	20 00		
do Shickluna .....	20 00		
do Lake Erie .....	20 00		
do Zealand .....	20 00		
do Alma Munro .....	20 00		
do do .....	20 00		
Schooner Denmark .....	10 00		
do Bigler .....	25 00		
Barge Republic .....	10 00		
Schooner L. L. Lamb .....		8 86	
do Jane Rolston .....		7 56	
do Senator Blood .....		2 00	
do R. Gaskin .....		43 50	
do Sasco .....		50 00	
Propeller Mineral State .....		12 00	
do Armenia .....		15 50	
do Dominion .....		10 00	
do Milwaukee .....		4 15	
do Lawrence .....		36 54	
	165 00	190 11	355 11

## STATEMENT shewing the Depth of Water on Lower Sill Lock No. 1, Welland Canal, for the Fiscal Year ended 30th June, 1877.

Months.	Lower Sill.		Months.	Lower Sill.	
	Highest.	Lowest.		Highest.	Lowest.
1876.	Ft. In.	Ft. In.	1877.	Ft. In.	Ft. In.
July .....	15 7	14 10	January .....	12 11	12 2
August .....	15 0	14 3	February .....	12 9	12 1
September .....	14 4	13 10	March .....	13 0	12 0
October .....	14 2	13 2	April .....	13 5	12 7
November .....	13 10	13 0	May .....	13 6	13 1
December .....	13 5	12 10	June .....	13 6	12 11
	Ft. In.				
Average depth June 1876.	15 0				
“ “ 1877.	13 2				

## WELLAND CANAL.

STATEMENT shewing the Depth of Water on Upper Sill Lock No. 27,  
Welland Canal, for the Fiscal Year ended 30th June, 1877.

Months.	Upper Sill.		Months.	Upper Sill.	
	Highest.	Lowest.		Highest.	Lowest.
1876.	Ft. In.	Ft. In.	1877.	Ft. In.	Ft. In.
July .....	15 9	13 2	January .....	13 4	11 10
August .....	14 0	13 1	February .....	12 3	11 4
September .....	14 3	12 5	March .....	13 4	11 3
October .....	15 1	12 1	April .....	12 5	11 2
November .....	14 6	12 3	May .....	12 10	11 11
December .....	15 8	11 1	June .....	13 2	12 0
Average depth June 1876.	Ft. In.				
1877.	14 0				
	12 7				

## APPENDIX No. 7.

## BURLINGTON BAY CANAL.

ST. CATHARINES, 8th August, 1877.

SIR,—I have the honor herewith to transmit report of the working and condition of the Burlington Bay Canal for the year ended 30th June, 1877.

The canal was closed on the 11th day of December, 1876, and opened on the 11th day of April, 1877.

A small house for the ferry man has been built at a cost of about \$400, the old one having become by age and decay uninhabitable and not worth repairing.

Some slight repairs were made to piers and ferry scow.

The ferry scow is so decayed that it will require to be replaced by a new one during the coming winter.

The covering of the piers is badly decayed and broken, but as the whole superstructure is also very much decayed, I do not think any extensive repairs to the covering should be made until the rebuilding of the superstructure, which will be required in the course of 3 or 4 years.

The Hamilton and North Western Railway swing-bridge over the canal is built and trains regularly run over the same.

The traffic over the canal by the ferry has largely increased since the opening of the Brant and Ocean Houses.

I have the honor to be, Sir,  
Your obedient servant,

E. V. BODWELL,  
*Superintendent.*

F. BRAUN, Esq., Secretary,  
Department of Public Works,  
Ottawa.

## APPENDIX No. 8.

### RIDEAU NAVIGATION.

RIDEAU CANAL OFFICE,  
OTTAWA, October 9 1877.

SIR,—I have the honor to submit my Annual Report on the works under my charge during the fiscal year ended 30th June, 1877.

Navigation closed on the 7th December, 1876, and opened on the 1st May, 1877.

The levels of the water in the different reaches were well maintained during the season of 1876.

The opening of navigation this year found our two main Reservoirs, upper and lower Rideau Lake, nineteen and nine inches respectively below the usual spring height.

The upper Rideau Lake (Summit) did not even rise to within seven inches of navigation height, this unusual occurrence, combined with a low rain fall, has been the cause of low water at the Newboro Cut, and there is no probability now of any increase.

No break occurred by reason of any defects in the works, and navigation continued uninterrupted.

The principal repairs executed at the different stations were as follows:

#### *Kingston Mills.*

Repairs to Lock Master's quarters, painting and repairing-swing bridge and some gravel placed on dam.

#### *Brewer's Lower Mills.*

New bridge over By-wash.

#### *White Fish.*

The stanchness of this dam being important, as any water wasted here is lost to the navigation, it was thoroughly overhauled, it is now stanch and the water under control.

#### *Jones' Falls.*

New bridge over By-wash, man hole on the 4th lock rebuilt, and one pair of gates which shewed signs of weakness, strengthened. Oak timber for a new gate delivered ready for use should it be needed.

#### *Davis's.*

Repairs to bridge over By-wash. Some masonry repairs to the wing wall.

*Newboro.*

Stone delivered for rebuilding wing wall. The upper wing walls of this lock are in a bad condition, and the leakage through them sufficient to fill the lock in twenty minutes, we are constantly obliged to keep the lower gates shut and under pressure all the time.

The lock being the first one descending towards Kingston from the Upper Rideau Lake, it is important that as little leakage as possible should occur here; the wing walls should be taken down and rebuilt next spring.

*Smith's Falls.*

New stringers and reconstructing swing-bridge.

*Merrickville.*

Swing-bridge renewed and approaches graded.

*Nicholson's.*

Swing-bridge renewed.

*Black Rapids.*

The protecting pier on the east side of the Flat dam rebuilt from the water line and filled with stone.

*Hogsback.*

The rebuilding of the bulk-head at this station was accomplished during the summer without in any way interfering with navigation.

It consists of five openings 20 feet wide closed by stop logs, holding back at navigation height a head of sixteen feet.

As a considerable amount of water had to be encountered owing to the dilapidated state of the old bulkhead, it was important that if possible the work should be done during the summer months when the water was warm, instead of waiting until after navigation closed.

The new bents were therefore built immediately in rear of the old stop logs.

By thus using the old bulkhead as a dam, the new one was successfully built during the summer.

When navigation was closed, the water was drawn down and the apron connecting the new and old work rebuilt.

*Hartwell's.*

Repairs to gates, and stone placed on dam across Dow's swamp.

*Ottawa.*

The sill of the entrance gates of the combined locks was leaking so much, that it was difficult to maintain the level in the locks above. The high gates 35 feet posts were also considered unsafe.

A dam was thrown across the entrance and the lock pumped out. It was found there that the mitre sill had raised at the point some six inches and the planking blown off. New gates were put, in the sill repaired and no trouble is now experienced.

The least side of the basin was cleaned out and an average depth of 5 feet obtained.

Barges and steamers experience no difficulty in now getting to the wharves.

The material excavated was used in filling in the old By-wash between St. Paul and Rideau St.

On the 26th August the Government Dam at the foot of Mud Lake, commonl, known as Chaffeys, was torn down by some evil-disposed persons.

This Dam held back a chain of lakes of considerable size (Mud, Birch Desert, Kingston and Canoe) the rain fall of some 75 square miles, and its destruction deprives the navigation of one of our most important water systems supplying the first descending level towards Kingston, known as the Devil Lake system.

The country embraced in this system is of granite formation, the sides of the lakes steep and rocky, and the land flooded, with few exceptions, is not capable of cultivation.

The works generally throughout the canal are in good working order.

I have the honor to be, Sir,  
Your obedient servant,

FRED. A. WISE,  
*Engineer and Superintendent.*

F. BRAUN, Esq., Secretary,  
Department of Public Works,  
Ottawa.

## APPENDIX No. 9.

### RIVER TRENT AND NEWCASTLE DISTRICT.

#### SLIDES, BOOMS AND NAVIGATION.

SUPERINTENDENT'S OFFICE,  
PETERBOROUGH, November 6, 1877.

SIR,—I have the honor to report on the Newcastle District and Trent River Works under my charge for the fiscal year ending 30th June last.

The water throughout the District from July 1st stood at an unusually high level until October 4th when it suddenly fell and continued to fall until the end of March. In consequence of this, and of the low snow fall during the winter, it did not attain to within eight inches of ordinary spring height at its highest stage, which was on May 21st. Notwithstanding this, the lumberers, with few exceptions, succeeded in bringing down their "drives" to their destination.

The traffic through the locks, especially at Bobcaygeon and Peterborough, has been unusually great, no fewer than 352 lockages being made at Bobcaygeon in one month, viz., last June.

Navigation closed on November 24th and opened on April 26th, the navigable season thus being a month longer than the average.

*Lindsay.*

The works at this station are in a good state of repair, and no repairs have been executed by the Department during the past year.

In the autumn months when the water is at its lowest stage, boats drawing more than four feet cannot get beyond the Railway Bridge in consequence of a bar which extends across the channel, so that when steamers are towing barges from the lower stations to Lindsay or Port Perry, they have to cast loose the "tow" at the Railway Bridge, where it is taken in charge by a second steamer held in readiness to receive it above the bar, and towed up the Scugog to Port Perry. It would, therefore, be a great benefit to the shippers of lumber, and other produce, as well as to the Whitby and Port Perry Railway, if this bar were removed.

*Fenelon Channel.*

The piers and booms in this channel have received a general overhauling and fixing, and are in a good state of repair. A petition was presented by the lumberers praying that the Government would authorise an exchange of channels, i. e., that the present steamboat channel might be set apart for the passage of timber and the timber channel for the passage of steamboats; but the steamboat owners and others presented a contrary petition, praying that the present channel be not altered.



*Bobcaygeon.*

The breach in the lower dam which was repaired in a temporary manner, received substantial repairs last winter and it is now in a safe condition.

The upper dam has received temporary repairs consisting of six half bents, to replace those carried away last year, also several string pieces were rock-bolted at the breast of the dam to retain in position the stone blocks between the bents. Both dams were bracketed and every precaution taken to retain as much water as possible on Sturgeon Lake. These dams retain the water at a navigable height up to Fenelon Falls and Lindsay, a most important stretch in the navigation of the District.

The platform of the slide requires renewal, and the side walls of the canal which are in a decayed condition and through which there is a great leakage, require renewal from low water mark to top.

The swing bridge across the canal was repaired in a temporary manner last winter, the repairs consisting of new flooring and the upper booms and transverse girders repaired. It is still in a dangerous condition. The swing portion, with the exception of the lower posts, requires renewal. All the traffic to and from the front has to pass over this bridge, and its present insecure state is the cause of complaint by the residents of the village.

The south head gate of the lock, which worked very hard, has been fixed. It was found that the pivot on which it turned was displaced; the cope stone of the hollow quoin which was fractured, was removed and a new one substituted. The flooring of the canal was partially repaired and also the upper mitre sill of the lock.

*Buckhorn.*

The piers of the slide, which were in a very decayed condition, have been repaired, and a new set of stop logs supplied. Large boulders, which were at the foot of the apron, and with which, cribs in running through, came in contact and frequently got broken up, have been removed. This has given great satisfaction to the lumberers in the district. A further improvement in the extension of the slide, about thirty ft, is desirable.

The dam, which maintains the navigation of Buckhorn, Pigeon and Chemong Lakes, leaks and requires to be gravelled. It is necessary that this dam be bracketed each year to retain as much water as possible, as in consequence of the large area of water surface, the evaporation is so great, that it is impossible in the dry season to detain the water at its navigable height unless this precaution is taken.

*Peterborough.*

As a new trade has been opened up between this town and Cobourg *via* the Otonabee River and the Cobourg Railway, the parties in connection therewith of both towns are anxious to have the obstruction to navigation opposite the town wharf removed. The obstruction consists of a sawdust bank formed at the confluence of two currents immediately opposite the wharf and which prevents steamboats at low water from turning thereat.

*Little Lake.*

The piers and booms have been overhauled and fixed; they are in a fair state of repair.

*Whitlaw's Rapids.*

The repairs executed at this station consisted in partially planking the dam, cleaning the lock chamber, extending the guard boom in the canal 140 feet, and constructing two piers each 15'x15'x12', to prevent steamboats at high water from being carried over the wing dam. This will enable steamboats to run when the water is at its highest stage, which they could not do with safety previously to its erection.

The obstruction in the river between this station and Hastings, known as the "Yankee Bonnet" shoal, has been partially removed. There are still some large boulders remaining which it is necessary to have removed, and a dyke built of boulders, constructed.

The obstruction at the point known as Dangerfield has not yet been removed. When this is done and the mouth of the river cleared, there will be no obstruction to navigation from Peterborough to Harwood, one of the termini of the Cobourg Railway.

#### *Hastings.*

The lock gates have been repaired and work with ease, and the sluices in the head gates which leaked, have been repaired. The swing-bridge is in good repair. The dam requires to be gravelled in order to retain the water at the required navigable height. A bar occurs about one mile above the dam, which from a recent survey I found to be composed of flat rock. The soundings taken shewed that when the water is level with the apex of the dam the depth of water in the channel varies from 3 feet to 3 feet 9 inches, and as the steamboats of the Cobourg and Marmora Mining Company, and the Peterborough Navigation Company, draw 3 feet 10 inches and 4 feet respectively, when the water falls to the level of the apex of the dam, they cannot run. If this bar were removed and the dam gravelled, there would be a free and uninterrupted navigation from Peterborough to Heeley's Falls, a distance of about 52 miles, for boats drawing four feet, when the water is at its lowest stage.

#### *Heeley's Falls.*

The dam at this station requires repairs. No repairs have been executed during the past year, and as it is the means of maintaining the navigation up to the village of Hastings, it is necessary that it should be kept water tight. At present the north half leaks very badly and requires to be gravelled.

The slide and booms at this station are under the management of the "Trent Slide Committee," and they are in a bad state of repair.

#### *Middle Falls.*

The works here are also under the management of the "Trent Committee." They were only erected for the descent of timber. Tolls on timber passing are levied by the Committee, who expend the revenue derived therefrom in repairing the works. They are in fair repair at present.

#### *Chisholm Rapids.*

The lock and canal at this station are not used. The dam is in fair repair. The slide and booms here are also maintained by the "Trent Committee."

I have the honor to be, Sir,  
Your obedient Servant,

THOMAS D. BELCHER,  
*Engineer and Superintendent.*

F. BRAUN, Esq., Secretary,  
Public Works Department,  
Ottawa.

## APPENDIX No. 10.

### SLIDES AND BOOMS—OTTAWA DISTRICT.

#### RIVER OTTAWA WORKS.

SUPERINTENDENT'S OFFICE,

OTTAWA, 11th October, 1876.

SIR,—I have the honor to report on the works under my charge for the fiscal year ended 30th June, 1877.

After the very high water season of the spring of 1876, the Ottawa and its tributaries fell to a fair working pitch during the summer and autumn months, and timber of all descriptions passed freely to its destination. As might have been expected, the works at all the stations were more, or less damaged by the extraordinary pressure of the spring floods, consequently the running of timber was attended with more expense than would have been the case had there been only an average height of water to contend with.

Many of the works are old, and as perishable materials enter largely into their construction, the closest attention of the staff employed is always required to guard against breaks which would cause serious delays and expense to the lumbermen in moving their timber.

During the year 1876, the following quantities of timber, &c., passed the north and south Chaudière Slides and the Gatineau Boom.

#### *Ottawa or South Chaudière.*

	Cribbs.	Pieces.
Square timber .....	13,536	321,906
Flatted " .....	49	1,002
Mixed, flatted and round.....	81	1,224
Spars mixed in square timber.....		60
Deal, 3 inch.....	299	
Deal and boards, hard and soft wood.....	10	
Boards, 1 inch.....	2	
Round cedars.....	6	
Dimension timber.....	13	
Total cribs and pieces.....	13,996	324,192

#### *Hull or North Chaudière.*

Sawlogs .....	145,578
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#### *Gatineau Boom.*

Sawlogs.....	246,064
Square timber .....	9,397
Flatted .....	13,252
Round cedars .....	2,036

Total.....	270,749
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Shortly after the close of the season of 1876, the works at the various stations were examined and repairs executed at the following during the winter months, viz: Joachim, Calumet, Mountain, Chenaux, Chats, North Chaudière (Hull), South Chaudière and Sault-au-Recollet on the River Ottawa, and on each of the following tributaries, Dumoine, Petewawa, Black River, Coulonge, Madawaska and Gatineau.

There was an early opening of navigation last spring (1877) and the water was at a favorable height for driving timber and logs on the main river and its principal tributaries up the 30th of June. No accidents were reported further than the breaking of a boom chain at the mouth of the Dumoine, which was caused by the want of proper precautions on the part of some of the lumbermen who had overcrowded the boom with timber and logs, and did not send a sufficient force of men to pass them through in time to relieve the works. Such of the pieces as escaped through the temporary opening were afterwards collected in the upper River Ottawa Improvement Company's boom, a short distance below the Rapides des Joachims.

I am glad to say that during the period covered by this report, there were no obstructions to the navigation of the River Gatineau for steamboats and barges by an over accumulation of logs in the Government booms near the mouth.

Notwithstanding the depressed state of the lumber trade, the returns show that a fair amount of business has been done at the various stations; but it is feared that a great proportion of the timber is being taken to already overstocked markets.

Before the opening of navigation in the spring of 1878, many of the works on the Ottawa and tributaries will have to be thoroughly strengthened and repaired, to prepare them for the passage of timber next season.

The amount of slide and boom dues accrued from Ottawa slides and works under my charge for the year ended 30th June last, was \$98,258.83.

I have the honor to be, Sir,  
Your most obedient servant,

GEO. P. BROPHY,  
*Engineer and Superintendent,  
River Ottawa Works.*

F. BRAUN, Esq.,  
Secretary Public, Works Department,  
Ottawa.

## APPENDIX No. II.

### SLIDES AND BOOMS—ST. MAURICE DISTRICT.

ENGINEER'S OFFICE,  
MONTREAL, 17th Nov., 1877.

SIR,—I have the honor to submit the following report on the St. Maurice Works for the fiscal year. 1876-1877, as requested by your letter, No. 41620 of the 1st ultimo.

#### REPAIRS.

The works executed during the first six months, consisted chiefly of repairs to the existing piers, booms, &c., and were carried on in accordance with instructions given Mr. J. B. Normand, the Acting Superintendent, by Mr. G. P. Brophy, Superintending Engineer, of the Ottawa Slides and Booms, their cost amounting to about \$2,400. They may be enumerated as follows, for the various Stations :—

#### *Mouth of St. Maurice.*

Three piers of 35 x 18 x 15½ feet in height, for the security of the booms.

Five piers of 12 x 12 x 3 feet in height for the fastening of the boom chains.

One floating pier.

Five piers raised 3 feet higher or to the surface of the highest water, which occurred towards May, 1876. This work was done in order to facilitate the working of booms during freshets.

#### *Shawenegan.*

One wharf, 172 feet in length, 14 feet in height, filled with stone fascines and earth, for the protection of the land whereon the Slide Master's dwelling is located.

#### *Grand Mère.*

350 lineal feet of single stick booms, with the requisite guy chains provided.  
Three piers of 12 x 12 x 5 feet in height.

#### *La Tuque.*

Boom Master's dwelling, 30 x 35 feet.

#### CONSTRUCTION.

During the subsequent six months the expenditure, which amounted to \$3,500 was principally for the construction of new works, which were executed partly by day's labor, and partly by special agreement, according to my instructions to Mr. Normand, and as authorized by the Department.

The work done at the previous Stations may be described briefly as follows, viz :—

*Mouth of St. Maurice.*

One mooring pier built at lower end of Ile Caron Piling done with stones and fascines behind the same for protection of Government land on the eastern side of the river, where it was undermined by the current.

*Shawenegan.*

One additional pier of 30 x 22 x 26 feet high, built for further security of booms.

*La Tuque.*

One pier 18 x 18 x 5 feet high.

Three piers 12 x 12 x 5 feet high.

380 feet of  $\frac{3}{4}$  inch chains connected with these piers.

Eighteen buoys, 15 feet long and 20 inches square.

*Iroquois Falls on the Vermillion Tributary.*

Two dams built on either side of island at upper entrance of former slide channel, on east side of the river, one of which 54 x 22 x 11 feet high, and one of 74 x 20 x 11 feet high.

Old dam between west shore and small island, opposite old slide entrance, removed.

360 cubic yards of rock removed from shoals at the falls, to facilitate the passage of saw logs.

**WORKS REQUIRED.**

In order to maintain the present works in a state of efficiency, it is desirable that a portion of them should be renewed or repaired each year, as some of them have been destroyed from time to time, by the ice, the undermining of the current, freshets or otherwise, and others are suffering from decay, having been constructed some 20 to 25 years ago.

The works most immediately required are shewn in my Report of the 24th of last September, wherein their probable cost is estimated at \$8,800, of which \$5,263 have already been authorized to be expended during the present season, by your letter No. 41625 of the 1st ultimo, and the remaining should be authorized as early as possible next year.

It will also be necessary to construct a small dam across the mouth of the former slide channel at the Grand Mère and two side dams or glancing piers at the Petites Piles, as well as to repair the long dam at the Grandes Piles, which has been much damaged by ice last winter; but these works can be deferred until the next fiscal year of 1877-1878.

**TRAFFIC.**

The number of saw logs which came down the St. Maurice during the past season, is about 250,000.

The quantity laying aground on account of low water or otherwise, in the main river and in its tributaries, is estimated at 100,000, of which 12,000 are at the Iroquois Falls, on the Vermillion.

I have the honor to be, Sir,  
Your obedient servant,

G. F. BAILLAIRGÉ,  
Asst. Chief Eng., Public Works, Canada.

F. BRAUN, Esq., Secretary,  
Department of Public Works.

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## APPENDIX No. 12.

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### SLIDES SAGUENAY DISTRICT.

SAGUENAY, 30th June, 1877.

SIR,—I have the honor to report on the works under my charge for the fiscal year ended 30th June, 1877.

The sum of \$518.28 has been expended in repairing the portion of the slide carried away by the water last year, and in placing booms.

A part of the slide, carried away by the water in 1876, has been repaired by Messrs. Price Bros., and works satisfactorily. An approximate sum of \$750 is required to build a pier at the lower end of the slide 60 ft. x 12 ft. x 9 ft. high, and to repair the remaining portion of the slide.

The expenses of management for the past year have been \$718.

35,000 saw logs passed over the slide in the month of June last.

The dams at Lake St. John and the boom at the head of the slide are in good order.

I have the honor to be, Sir,  
Your obedient servant,

D. BOULANGER,  
*Superintendent.*

BRAUN, Esq., Secretary  
Department of Public Works,  
Ottawa.

## APPENDIX No. 13.

### HARBORS ST. LAWRENCE AND WESTERN LAKES.

OTTAWA, 22nd October, 1877.

SIR,—I have the honor to report upon the Harbor Works and Surveys of the past fiscal year.

#### RIVER ST. LAWRENCE.

##### *Matane.*

Matane is situated on the South Shore, 240 miles below Quebec, at the mouth of the River of that name. Its population is about 1,500.

A basin of some extent at the River's mouth, dry at low water is protected by a spit of sand to the north of it.

The nearest accessible station on the Intercolonial Railway is St. Octave, distant by the way of Little Metis, 30 miles.

A survey has been ordered of the river and basin at its mouth, to determine the capacities presented for a harbor, the extent they may be developed, either as a tidal harbour, or one accessible at all stages of the water. The examination to determine if it be feasible to obtain accommodation for steam vessels of the largest class requiring 30 feet of water, or whether it be desirable to limit the work to a harbor of refuge for lake-going vessels which would exact 17 feet of water only, the depth on the Canal sills being 14 feet.

The examination will be immediately made.

##### *River Blanche.*

River Blanche is situated between the Rivers Tortigoux and Matane, about 26 miles east of the River Metis.

A mooring crib 70 x 30 feet at base, battering to 60 x 24 feet at top, with a total height of 18 feet from base to summit was completed in August, 1876.

##### *Trois Pistoles.*

Trois Pistoles may be said to be 135 miles from Quebec; the village, however, extends nearly two miles in length. The only landing places available for the inhabitants are River du Loup and Rimouski, being distant, the former 27 and the latter 39 miles. The population of the district embraced in this consideration is nearly 30,000 souls, half of whom have considerable distances to pass over to reach a landing place.

Much agricultural produce passes westward in the shape of grain, potatoes, butter and cordwood. The inhabitants have asked for a pier where they can load or unload at half tide. Extreme spring tides vary about 18 feet, and neap tides about 10 feet.

Three points present themselves as available for a landing place:—

1st. At Point à Rioux, on the farm of the *cultivateur* of that name, one mile below the church.

2nd. At the old Church Point.

3rd. At Point aux Îlets to the west of the land of Hilaire d'Amour.

The last named is shallow and offers few advantages.

Point à Rioux is not central in position and will require a pier of great length.



The old Church Point is situate to the west of the harbor, into which schooners come at high water and is well sheltered from the north-west winds. At low water, vessels are left dry. A harbor can be obtained here at certain stages of the water by the removal of boulders at moderate expense. This locality offers the greatest advantages for the construction of a pier. It is central, and a pier would cost less money here than elsewhere; a pier 600 feet in length will give 8 feet of water at half tide; but such a wharf cannot be constructed as a first-class structure under \$39,000.

It is this difficulty of cost which explains the limited number of wharves below Quebec. The tidal river, and storms which sweep over these waters exact structures of great strength and height.

I cannot, myself, consider that any wharf should have less than 5 feet above high spring tides. There are wharves which have been constructed at a lower level, but the tempests which periodically rage in the lower St. Lawrence call for special consideration.

It may be set down as a rule that a depth of 12 feet is required for any pier to be perfectly serviceable. Schooners frequenting the Gulf ports vary in tonnage, from 50 to 85 tons with a draught when loaded of from 10 to 12 feet.

In order to obtain this depth, the wharf in this locality would require to be carried out 2,000 feet from the shore, and even then dredging would be called for at the approach to admit the entry of vessels of this character at low water.

On the other hand, it will be possible, at a cost of \$11,000, to construct a wharf 260 feet in length, which would give 7 feet of water at half tide. Such a structure would accommodate the smaller fishing craft of the neighbourhood, the wharf to be 25 feet wide, in cribs 30 feet in length, 25 feet apart, the end crib being 40 feet in length to admit of a landing stage, the work to be roughly and firmly put together.

The extreme height to which all wharves in this part of the Dominion must necessarily be constructed, makes an inexpensive structure impossible. The distinction between the Lower St. Lawrence and the lakes and rivers of Ontario, must never be lost sight of when the question of wharf accommodation is considered in any aspect in a comparative estimate of the two Provinces, for the moderate priced wharves of Ontario are simply impossible in Quebec.

In the view, therefore, that a more expensive wharf would attain only limited results without prospect of improvement, I beg leave to recommend the less costly wharf at \$11,000, should it be determined upon, and that the point selected be the Church Point.

#### *River du Loup*

Is 103 miles below Quebec, on the south shore of the St. Lawrence.

This pier has been restored where the side timbers and cross ties were found to be decayed, and is now in fair repair. The work was carried on between the months of July and September, at a cost of \$909.30.

#### *River Ouelle*

Is situated 75 miles below Quebec.

The sum of \$1213.78 was expended between July and September, in placing the pier in repair. It is generally now in good condition.

#### *St. Jean Port Joli*

Is 55½ miles below Quebec, and on the south shore of the St. Lawrence.

Arrangements have been entered into with the Syndic of the pier for the expenditure of the parliamentary appropriation of \$2,000. This vote is contingent on the expenditure of a like sum by the municipality. Accordingly, a pier 233 ft. × 20 ft., has been constructed, formed of three cribs on which the road way is carried by framed trusses with a crib 60 ft. × 20 ft. at the end. An additional crib will accordingly be added 60 feet long, increasing in width at the end to 40 feet, which will give 11 ft. 6 in.

at half tide. The work will be performed under the Syndicat the pier, according to the directions of the Department.

#### *L'Islet.*

This pier is situated on the south shore of the St. Lawrence,  $46\frac{1}{2}$  miles below Quebec.

It was completed in 1855, and has therefore been constructed 22 years. The original cost was \$113,343.27, and no repairs have been since made of any extent.

Its length is 1,200 feet and it has been repaired over a portion of its length. The work will be continued during the present year; but two seasons will be required before the whole length is thoroughly and efficiently restored.

The side timbers and ties of the pier being generally decayed, it is necessary to replace them with sound timber. The approaches, which were protected by cribwork, also need restoration.

It has been decided to build a protecting wall to the approach, and to place sound timber in the structure where necessary.

The work of restoration was commenced in the season of 1876, and the sum of \$1906.99 was expended. It was resumed early in May, and has been continued till the close of the fiscal year. During the coming season the work will be pushed on as fast as possible, arrangements having been made for the purchase of material. It has also been determined to raise the southern end of the pier to the required height, the original structure being lower at that extremity than at the end. The result has been that in storms when the sea ran high, it was not possible, without risk, to pass over the lower level. On its completion the whole pier will be of one level, viz, that of the present head at the outer end.

#### *Berthier.*

The pier at Berthier is  $24\frac{1}{2}$  miles below Quebec, on the south shore of the St. Lawrence.

The work of restoration at this pier will be completed this fall. It is 587 feet in length, and was completed in 1853, at a cost of \$37,723.14. It has therefore been built 24 years.

As the side timbers and ties were decayed, it has been necessary to place sound timber where required. The approach has likewise been widened and improved. The work of restoration was carried on during the working season of 1876, during which the sum of \$3,938.17 was expended. The work will be immediately recommenced, and will undoubtedly be completed by the end of October. Hitherto, the roadway has been formed of broken stones, but the effect of heavy seas has been to wash away this material and to leave large holes in the middle of the road. It has, therefore, been determined to plank over the roadway, a protection indispensable in the influences to which the wharf is exposed.

When the projected works are completed, the pier will be thoroughly restored and repairs of a serious character will not be required for many years.

#### BAY OF QUINTÉ.

##### *Belleville*

Is an important town on the Bay of Quinté, 48 miles from Kingston and 113 miles from Toronto.

The sum of \$2,000 was allowed out of the dredging fund to the Council of Belleville, provided the municipality paid \$1,000 for deepening the eastern branch of the harbor.

Work was commenced during the last days of June, and it is anticipated that it will be completed towards the end of August.

*Trenton*

Is at the head of the Bay of Quinté, 60 miles from Kingston and 12 miles above Belleville.

The sum of \$4,000 was voted at the last session of Parliament to improve the entrance of the harbor.

A shoal 2,100 feet across, about 4,000 feet from the wharves and elevators, requires to be dredged so that a wider channel be obtained 10 feet in depth at the lowest water.

Tenders will be immediately called for and the work will be executed during the coming season.

Nigger Island, 4 miles from Trenton, was further surveyed in the fall of 1876. Channels were found both on the north and south sides, the latter, however, is the one generally taken. An excellent channel was found of not less than 14 feet at its most shallow part, the narrowest point of which is 300 feet wide. It is somewhat tortuous and requires to be buoyed at the opening of the navigation. But no one appears to take up this duty, although vessels making for Trenton are alone interested in the channel being defined.

## LAKE ONTARIO.

*Cobourg.*

Cobourg, on Lake Ontario, is 72 miles east of Toronto.

A pier 1,500 feet long by 30 feet wide, has been built in continuation of the line of Hibernia street.

This work was completed at the end of September in last year, and was accepted from the contractors.

During the storms of the ensuing winter, the level of the superstructure was effected, owing to the sinking of some of the furthestmost cribs. This inequality of level extended over half of the outer distance. In the spring of this year, instructions were given to bring up the superstructure to a level, and that work is now in progress and will be completed in the course of the ensuing months.

This pier has now been in course of construction since October, 1874. The first contractors failing to commence the work, it was given to other contractors and commenced in May, 1875. 32 cribs were sunk during that season, the remaining 16 cribs were sunk in 1876. Much of the superstructure was also placed during 1875 on the 32 cribs then sunk. The water during this year was 3 ft. 5 in. higher than in 1876, and this difference of level will be hereafter seen in the difference of height of superstructure, which became increased as the water lowered. The structure has been subjected to severe storms, and its stability has stood the test satisfactorily.

*Newcastle.*

Newcastle, on Lake Ontario, is 47 miles east of Toronto.

The harbor was surveyed late last fall to determine the existing impediments to navigation.

The sum of \$5,000 was voted at the last session of Parliament to improve this harbor, and steps have been taken to make the expenditure of the money in conjunction with the Harbor Trust. The whole amount of the vote will be expended in dredging. Tenders will be immediately called for and the work performed this season.

*Toronto.*

The original parliamentary appropriation for the improvement of Toronto Harbor was \$20,000. Of this amount \$1,856.93 was expended on the two surveys necessary to make a thorough examination of the harbor in order that the question

which had been raised that the harbor was filling up and being rendered valueless might be fully considered.

This point was reported on by the writer, on 7th July, 1875, in which he endeavoured to allay the doubts which were then expressed, and he submitted that the improvement immediately called for was deepening and straightening the western entrance, and making it more easy of access to vessels entering the harbor, and that he did not conceive the variation of the sand banks called for any particular attention. Certainly, he formed this opinion in view of the assertion that steps were required for the preservation of the harbor, which, to his mind, is generally in the same condition as when it was first visited by Bouchette.

The western entrance will always be liable to the risk of being more or less filled in with deposit on the close of winter, a result attributable to the wash of the lake against the ice grounded on the shoal, which carries away, as the wind may direct, much of the material forming the surface deposit of Gibraltar Point. Our own operations have distinctly established that the shallow water at the Queen's Wharf is caused by an outcrop of rock, and so disprove the theory that the formation of the Island has been caused by the wash from the lake bank to the south of the harbor being here deposited.

The work of the last fiscal year has consisted of two classes; that performed under contract by dredge, and a party working by time work to blast and remove the stone *in situ*.

The dredge worked from 4th July, to the 3rd of December, 1876; this season it commenced on 25th of May to the 30th of June, and will continue its operations during the coming year.

The point of shoal jutting out from Gibraltar Point has been partially removed, so that a depth of 14 feet at low water has been obtained. This depth has been carried along the front of the Queen's Wharf on a width from 145 feet to 75 feet at the east end, till it meets the rock which crops out near the western line of the warehouses and trends obliquely to the south-east. The rock was then scraped for removal by an explosive.

13,380 yards of excavation were taken out by the dredge in 1876, and 4,168 yards up to the 30th of June last.

Some labor was entailed in removing the ridges left incomplete under previous operations.

615 holes were jumped for nitro-glycerin blasting, the average depth of which was 39 inches, of which 633 were satisfactory exploded.

The whole operations have hitherto been confined to the western approach, and nothing has been done east of the Queen's wharf.

The rock fired last season adjoining the Queen's wharf, has been removed this season. There is, therefore, on a width of 24 feet adjoining the wharf, a depth of 15 ft. 5 in., and an outcrop still remains to be dealt with between that depth and the dredged portion to a depth of 14 feet. The intention, however, this season is more particularly to improve the western approaches. The dredging performed to this date extends over a length of 550 feet west of the wharf at a depth of 14 feet, having a width at the east commencement of 200 feet and at the west of 185 feet. An additional sum of \$5000 from the dredging fund has been appropriated for the continuation of work in this direction while the intermediate stone outcrop left untouched last season will be removed.

The entrance to Toronto, as has been remarked by the writer in previous reports, must be governed by the depth of the Welland Canal. So long as there is but 12 feet on the lock sills, 14 feet will be ample for the western entrance of Toronto, but when the Welland Canal is deepened, the entrance of the Toronto Harbor, *pari passu*, must be deepened with it.

Oakville.

The Harbor of Oakville is situate at the mouth of Sixteen Mile Creek, Lake Ontario, 21 miles from Toronto and 18 from Hamilton.

This harbor was surveyed in July, 1876, with the view, if possible, of determining the boundaries of the harbor property; the question having been raised as to its extent in the matter of its approaches and the superficies of waters held to be included within its limits.

Unusual difficulties present themselves when this question has to be determined, no maps of any character being available to define the limits, and there is no antecedent evidence to shew what at any time was held to constitute the harbor.

The land was originally ceded by the Mississagua Indians. The first patent of the property is dated 2nd March, 1821, and it includes lots 13, 14 and 15, in the Township of Trafalgar, in the County of Halton, reserving all navigable waters and free access to the beach. On the 25th of March, 1828, authority was given by the Legislature of Upper Canada to construct a harbor and to collect tolls. The Act to be in force for fifty years, at the end of which period the harbor to revert to the Crown.

On the 16th March, 1831, authority was given for a loan to Mr. Chisholm of £2,500.

On the 10th February, 1840, payment of the principal was extended ten years from date on mortgage on the harbor.

Eventually all the land adjoining the harbor was formally released from the mortgage.

Owing to the non-payment of the loan and the accruing interest, the Act of 14th April, 1871, was passed to authorize the sale of the harbor. On the 5th November, 1874, the harbor was transferred, by Order-in-Council, to the Town of Oakville, with the appurtenances as vested in the Crown, and on the application of the municipality to define the limits, the survey was made.

It is plain that the rights of the Government have never been defined, and the question is the extent to which they are definable.

All the facts bearing on the case were gathered by the writer and submitted to the Department, and the conclusion which forced itself on his mind was that the question of disputed possession was one remaining for the decision of a Court of Law and not one to be settled arbitrarily by any technical principle.

#### RIVER NIAGARA.

This river was surveyed from the old Fort Erie to the International Railway Bridge, including both sides of the river, and soundings were taken on such portions of the river as in any way had bearing on the question which has been raised on the general navigation of the river by the inlet crib of the Buffalo Water Works, constructed in American waters.

These soundings were taken from half a mile above the inlet crib to below the International Ferry Docks.

This work was performed by Mr. Hamel in the months of August, September and part of October.

#### LAKE ERIE.

##### *Port Burwell.*

The Harbor of Port Burwell lies between Rondeau and Long Point, being distant from the former 62 miles, and from the latter 22 miles.

The shoal at the entrance was reduced by dredging, and, with the harbor, brought to a depth of ten feet, this depth extending to a short distance above Brock Street. The work was commenced on the 23rd of June, and was closed on the 21st of October, 1876.

The surplus of \$1,400 which remains will be employed in further improving the western pier by restoring the superstructure, 465 feet having been placed in good condition in 1875. It is expected that 270 feet will be similarly improved this season, making a total restoration of 735 feet of superstructure.

The work will be completed early in the fall.

The total expenditure on Port Burwell voted by Parliament is \$10,000, of which \$5,626.56 has been expended in dredging.

*Port Stanley.*

This harbor is at the mouth of Kettle Creek, on the north shore of Lake Erie, about 110 miles above the mouth of the Welland Canal, at Port Colborne.

Instructions have been received to make an examination of the harbor in order to determine its condition and present capability, and to inquire if, during late years, it has deteriorated in the general accommodation which it formerly furnished to vessels.

*Rondeau.*

This harbor is situated at Point aux Pins, on the north shore of Lake Erie, 140 miles above Port Colborne at the entrance of the Welland Canal.

Instructions have been given for an examination of the openings made by the severe storms of Lake Erie, which have broken through the sand banks hitherto protecting Rondeau Basin. Further, to furnish estimates for the necessary work to protect the Bay from the rough water of the Lake, both on the east and west sides of the cribwork opening.

LAKE ST. CLAIR.

*River Sydenham.—North Branch.*

The North Branch extends from Wallaceburgh at its junction with the East Branch to Wilkesport, a distance of 15½ miles by the river, and about 12 by the road.

The river was examined from Cranson's Bend, about six miles from Wilkesport. 23 shoals were found in this distance. The water from Wallaceburgh to Cranson's Bend is sufficiently deep, having a depth of from 14 to 18 feet.

These shoals vary in extent from 130 to 2,670 feet.

A large amount of cordwood and some lumber is carried over these waters in schooners and steam barges.

Owing to the distance to be made to reach deep water by the scows, and the large amount of sunken timber, much of it hard wood, and partially embedded, the dredging operations necessary to obtain eight feet of water on a width of 50 feet, will require a whole season's operation of eight months. This work would include a winding basin near the bridge at Wilkesport.

*Bayfield.*

In the Township of Stanley, Lake Huron, 10 miles south of Goderich.

This work commenced in April, 1875, and was completed at the end of May last.

There was a Parliamentary appropriation of \$34,000 for this work, and a sum of \$10,000 was voted by the municipality of Stanley, and a further sum of \$10,000 was charged against the dredging fund for deepening the harbor, making a total of \$54,000.

The work consists of a prolongation of the northern pier, measuring 105 feet on the outer side, with an arm of 156 feet, turned to the south-west; with pier on the south side generally parallel to the main line of the opposite pier, 180 feet distant from it, being 553 feet in length, with a return to the coast line of 153 feet. All the cribwork is 30 feet wide.

The harbor has been partially dredged to a depth of ten feet, while the water at the immediate entrance is 11 ft. 6 in.

During the progress of the work, and since its completion, the storms of the Lake carried away some of the bank on the cross line, forming an opening through

which the water of the Lake passed, so that some additional protection is necessary. Instructions have been given for a rip-rap wall on a foundation of brush, by which the approach will be thoroughly secured. This work is now being carried on, and will be completed in a few weeks.

The opening made by the storms carried some material into the harbor below the crib-work, which it will be advisable to remove when feasible.

The harbor itself, when this dredging is given to it, to the extent of its capacity fulfils the expectation entertained. The water within the crib-work is quiet in all winds when the lake is stormy. Were it possible so to do, it would be advisable to obtain an additional depth of two feet which would turn it into a really safe harbor of refuge for most of the vessels navigating Lake Huron.

### *Kincardine.*

The Inner Basin has been completely dredged to a depth of 12 feet. This basin extends on the east side 450 feet, on the south side 262 feet, and on the west side to the point opposite Rightmeyer's store, 360 feet, making the superficies from the east of Rightmeyer's store to the line of the west side, of 4.2 acres. It is protected by close piling; the west side has been executed from the designs of the Department and constructed under its direction and paid from the Parliamentary vote. The completion of the west side, 165 feet, was paid from the Parliamentary vote, but constructed by the corporation.

The north and south sides were constructed and paid by the corporation of Kincardine.

The Departmental dredge worked from the 15th May, 1876, to the close of the fiscal year, and it was anticipated to remain about 20 days before its removal to Owen Sound.

The entrance between the piers was dredged out also to a depth of 13 feet.

The additional crib-work at the end of the present piers, each of 100 feet in length, has been completed. The south is somewhat turned in a south westerly direction, to give greater ease of entrance and the position of the new piers has obtained the satisfactory result looked for. But additional crib-work is necessary to place this important harbor in the condition that it should be.

A length of 300 feet of crib-work added to the north pier turned in an almost south-westerly direction would leave the entrance to the harbor open and sufficient, and would entirely protect the water within the piers and leave it calm in extremely stormy weather.

The prevailing winds to be guarded against on Lake Huron are the west and north-west, with occasional gales from the south-west, and no harbor can be looked upon as efficient unless protection be extended against them.

The geographical position of the harbor and the increasing commerce of the Town of Kincardine, the terminus of the Lake Huron Branch of the Great Western Railway, and where there is every probability that railway connection will soon be made with Toronto, point to the peculiar circumstances which give this harbor a strong claim to consideration.

During the storm of last season, five of the large mail steamers navigating Lake Huron sought shelter in the basin, where they lay in perfect security during the storm which raged during three days, and where such protection can always be found in the most severe gales. During this storm, however, a part of the old wharf was seriously damaged. This was the wharf built on piles many years ago with little claim to stability. The consequence was that much of the material of the Lake was washed into the harbor and filled up the channel.

Instructions were given, on the completion of the work at Owen Sound, of the present fiscal year, to put the channel in good order, and the dredge arrived here on the 26th June and commenced the removal of this material on the 28th instant, and will continue the work until sufficient depth has been obtained.

Further to replace the damaged portion of the wharf by crib-work, the sum of \$12,000 was included in the Parliamentary estimates for that purpose.

It is proposed to tear up the old piling and to place nine cribs of 30 feet in length to make the opening good, and it is anticipated that the work will be performed before the end of October.

Some of the superstructure on the north pier, about 300 feet in length, is below the required height, and it is designed to bring it up to the height of the newly constructed pier.

Instructions have been given to have this work executed in connection with the superstructure of the new crib-work, situate in the middle of the distance where the deficiency of height is found.

When this work is completed the north pier to the land line will have been placed in excellent condition. Owing to this wharf being taken regularly by the North-West Transportation Company's boats, the Harbor and Inner Basin require a depth of fourteen feet.

#### GEORGIAN BAY.

##### *Owen's Sound.*

This harbor has been generally deepened and its approaches straightened.

A channel from the dry dock to deep water at a short distance outside the outer light on the line of the two lighthouses was dredged 150 feet wide, 12 feet deep. The length is about 2,000 feet. The remainder of the channel up to the swing bridge has a depth of 10 feet and varies from 125 to 200 feet in width, a difference owing to the natural bends of the river.

A winding basin, nearly opposite Smith's dock, 200 feet square, 10 feet deep has also been formed.

The dredging was done by the government dredge "Challenge." Work was commenced on the 27th of July and continued till the 29th of November 1876. It was recommenced on the 19th of May, and continued till the 20th of June, when the dredge was removed: 10,847 cubic yards of material were excavated.

##### *Keppel Pier, Colpoys Bay.*

This pier is situated on Lot 38, Colpoys Range, Township of Keppel. It is 335 feet in length, being constructed on eight cribs and taken up to 6 feet above water level. The stringers are carried over corbels and the pier covered with 2-inch plank. The sum of \$400 was paid by the Department towards the construction of this work on the report after examination that it had been satisfactorily executed. The remainder of the charge was borne by the municipality.

##### *Parry Sound.*

The Village of Parry Sound is generally built on the north shore of the River Seguin, in the Township of McDougall. It is distant by water from Collingwood 70 miles.

It has been advanced that connection can be made by steamboat at Penetanguishene with the Railway from Barrie, and at the Midland Harbors with the Midland Railway from Port Hope, the boat passing through the group of islands which lie off the mainland. They are seen in groups to present an unusually picturesque appearance. If a route were opened through them served by a commodious steamboat, they would doubtless be visited by many tourists during summer.

There is an open navigation at present outside of these islands through the Georgian Bay for commercial purposes.

These waters have been examined with the view of making the route through the islands navigable for vessels of moderate draught. Four obstructions were found, viz.:



1. At  $2\frac{1}{2}$  miles from Parry Sound, between Barker and Rocky islands.
2. At 7 miles from Parry Sound, at a place called Burritt Narrows, between the Mainland and McLaren Island.
3. 8 miles from Parry Sound, between small islands.
4. 10 miles from Parry Sound.

The obstructions were found generally to consist of rock *in situ*, which can only be removed at some cost. A channel of seven feet of water is estimated to cost \$20,000, while a channel of 10 feet would call for an outlay of \$60,000.

### *Neebish Rapids,*

At the foot of Lake George, half-way between Bruce Mines and Sault St. Mary. These rapids must be considered as a reach of the navigation west of Buffalo, being in the direct route to Lake Superior for all vessels, both Canadian and those of the United States.

East of Buffalo the navigation is determined by the water on the sills of the enlarged canals, while the construction of the new St. Mary's Lock has virtually established the limit of navigation hereafter to be obtained on Lake Superior, viz., for vessels which can float over a lock sill with 16 feet of water at low water.

This depth of 16 feet is the depth of the new lock of the St. Mary's Canal, the depth hitherto having been 12 feet. This increased depth seems to have been imposed by Lake St. Clair, which is described as having a depth at its lowest range of nearly 19 feet, and it is held that in stormy weather it cannot be navigated by craft of greater draft than 16 feet.

The first impediment leaving Buffalo and the Welland Canal, is the outcrop of rock at Amherstburg, known as the "Lime Kilns." A line of navigation was obtained by the Department in 1875 of 14 ft. 5 in., marked out by ranges which are lighted at night, so that it can be taken at all hours.

The next natural obstruction is the well-known St. Clair Flats, which has been overcome by the United States Canal, which has a depth of 16 feet of water in the centre, and which possibly will hereafter be somewhat deepened.

Hitherto, the Neebish Rapids have been held to be the next obstruction, but report states that a shoal exists known as the "Chicora Shoal,"—so named from having been run on by that vessel—east of Richard's Landing; some three-quarters of a mile on Bear Lake.

The Neebish Rapids succeed where the work has lately been carried on.

The next difficulty hitherto experienced, has been in the shallow parts of Lake George, about the centre of the Lake. The shallow portions were dredged by the United States Government originally to a depth of 14 feet, and this is the channel now followed; but there is reason to believe that it has somewhat filled in, and that 14 feet cannot be obtained at lowest range of water. Our own experience would limit the depth of the two extremities of the cut to 13 ft. 5 in.

Previous to the formation of this channel, the channel in Canadian waters was taken, and when it is expedient, an examination should be made so that its full character can be understood, and the cost of its development established.

From a *reconnaissance*, somewhat imperfect, the impression has been formed that there is only a bar of from 400 to 600 feet which requires to be cut through. The length of the American dredging is about three miles on a width of 200 feet, and by no means straight, so that it cannot be navigated by night, and it would be difficult to light.

From Lake George to Sault St. Mary through what is called Garden River and the River St. Mary, the channel is described in many quarters as being tortuous with frequent obstructions, the principal of which is at Topsail Island, about  $2\frac{1}{2}$  miles east of the lock. Nothing can be found available for reference on this subject, but complaints of shoaly spots and obstructions have been frequently made to the writer by captains of mail vessels, and it is considered that the expense of increasing the navigation beyond its present limit of 12 feet, will be serious. Nothing definite,

however, is known of these waters, and they require to be surveyed and examined from Churchville at Lake George, to the Canal, a distance of between 11 and 12 miles, so that a proper channel can be laid down, and an estimate made of the improvements required at the shoaly spots.

It will be seen by the above that the Neebish Rapids will eventually require to be deepened to 18 feet, at least, to form a link in the system of the future navigation of Lake Superior.

The present design is to make a channel in these rapids 200 feet wide with a depth of 14 ft. 5 in. lowest range.

These rapids extend a length of 1,600 feet, and have been caused by the deposits of many ages of large boulders, several of them of great size, and by outcrops of rock between which the intermediate pockets receive sand and boulders.

Work was commenced here in July, 1876, and continued till the 27th of October, of the same year, when, from unfavorable weather, it was considered advisable to close. It recommenced this year on the 18th of June, and will be continued till the end of the season.

Owing to the distance of the works from any dwelling, it was necessary to build cheap barracks for the men employed.

The operations have been carried on with a tug, scow and divers, the rock *in situ* being removed by nitro-glycerin. Much progress was made in 1876, and by the close of the season, captains of boats recognized that the channel had been considerably improved. There always has been a channel by which the rapids have been navigated, and as hitherto most of the commerce passing in this direction belonged to the United States, the buoys pointing out the channel have been annually placed by agents of that country, although the channel is entirely in Canadian waters.

The natural channel was so narrow and tortuous that it could only be taken by one thoroughly knowing it, and by following land marks arbitrarily established. It has never yet been navigated by night, and it was never taken either way without great precaution being used, and, so far as can be judged, without great anxiety.

The operations of last season gave admitted relief, for the worst points which were well known were first attacked.

It is anticipated that the operations of the present season will almost entirely remove the sense of difficulty which captains of vessels have experienced when passing through these hitherto dangerous waters, so frequently the scene of disaster. It will, however, require another season beyond the present year, thoroughly to place the work in a proper condition so that ranges can be established, and if lighted by night, vessels can ascend as in any other part of the navigation. But Lake George, as it is at present, will still present an obstacle to movement by night.

When the improvement is completed so far as the limit is established, of 200 feet wide by 14 ft. 5 in. deep, the most trying and dangerous reach of navigation between the Welland Canal and the River Kaministiquia, Lake Superior, will have been removed.

The works have been carried on with zeal and ability by my assistant, Mr Andrew Kilganan.

#### *Prince Arthur's Landing.*

Prince Arthur's Landing is on the north coast of Thunder Bay, about 19 miles from Thunder Cape, and 3 miles from the entrance of the River Kaministiquia.

A complete survey of Prince Arthur's Landing has been ordered, with instructions to report on the capacity of the locality for a harbor, and the cost of protecting it from the winds which call for consideration, with additional instructions for the whole matter to be thoroughly investigated.

#### *River Kaministiquia.*

This river was surveyed from the deep water east of the shoal, in itself 3,500 feet across, to the Pacific Railway terminus a distance of 3.2 miles.

The River Kaministiquia possesses the advantage of forming an excellent harbor for shipping, offering perfect protection against all winds.

It presents a marked parallelism to the rivers which have led to the commercial pre-eminence of Chicago and Milwaukee. The drawback to its general excellence is the shoal extending directly across its mouth 3,500 ft. in width. The river is deepest at the Pacific Station, and shallowest at its mouth. The design is to obtain a navigation of 13 feet.

The width of the river is generally 350 feet, and it is evident that we have here a harbor of rare capacity equal to any of the requirements of commerce which the enterprise calling it into being may create, giving efficient protection to shipping with every convenience for wharf construction.

Dredging was commenced on the 24th July and continued till 14th October, when 21,570 yards were removed. One cut was taken entirely across the shoal and one half the second cut made. The work was resumed on the 4th June and continued till the end of the fiscal year. It will be continued during the season, and there is no doubt that the heaviest laden vessels of the North-West Transportation Company, will be able to enter the river to the Pacific Railway Dock by the end of September.

It is proper to put on record that if the channel be limited to 45 feet much difficulty will be experienced by vessels entering. The south-east winds are frequently troublesome and unless sufficient width be given for a vessel navigating the new channel, there is constant danger of grounding, no width under 66 feet, say three cuts of dredge, will be even approximately safe. In fair weather the 44 feet entrance is even barely sufficient when the channel is properly buoyed.

#### *Dredge "Challenge."*

At the commencement of the last fiscal year the dredge was still at Kincardine, where it continued working till the 19th July, having removed up to that time 7,740 yards of material in the harbor.

On Monday, the 24th July, the steamer "City of Owen Sound" arrived at Kincardine to tow the dredge to Owen Sound, which place was reached on Wednesday, the 26th, at 4.30 a.m., and work was commenced the following day.

The dredge worked till the 29th November, when the crew was disbanded and the plant placed in winter quarters. Work recommenced on the 20th May of this year, and was continued till the 20th June, when the dredge was placed in condition to be removed to Kincardine.

It was taken on the 24th and 25th June by the tug "Kate Moffatt," and arrived in the morning of the 26th.

Work was commenced on the 28th June at Kincardine.

During the winter season the two shovels were materially strengthened and the dredge engine and machinery placed in repair and the crane circle also renewed. Further, the tug engine was overhauled; 200 feet of Lake Superior iron chain was also purchased to replace the old one, which was much worn. The total cost, including the chain, was \$655.42. The dredge and scows were also generally painted, the hulls and upper works being left black with a red rubbing streak.

The whole of the dredging plant is generally in good order, the upper works of the tug being excepted.

It may be looked for that the tug will shortly require to be considered in this and other respects.

I have the honor to be Sir,  
Your obedient servant,

WILLIAM KINGSFORD,

*Engineer in charge.*

*Harbors St. Lawrence and Western Lakes.*

F. BRAUN, Esq., Secretary,  
Public Works Department.

## APPENDIX No. 14.

MARITIME PROVINCES, ST. PETER'S CANAL, HARBORS, PIERS, RIVERS, &c :

SAINT JOHN, NEW BRUNSWICK,  
October 24, 1877.

SIR,—I have the honor to report on the works under my charge in the Maritime Provinces, for the fiscal year ended 30th June, 1877. These consist of:—

Works under contract in New Brunswick.

"	"	Nova Scotia.
"	"	Prince Edward Island.
"	direct charge in	New Brunswick.
"	"	Nova Scotia.

Dredging.

Surveys and examinations.

### WORKS UNDER CONTRACT IN NEW BRUNSWICK.

#### *St. John Breakwater, (at Negro Point.)*

At the close of the fiscal year, the work had been extended out to the full length of 2,250 feet, the wood work being completed to its full height over a length of about 1,600 feet. During the past winter it withstood, in its unfinished state, several south-west storms without damage. It may be stated here that this work was finally completed and accepted in September of this year.

#### *Shippegan.*

With the closing of navigation last year, the works at Shippegan were brought to a close, and up to the end of the fiscal year were not resumed by the contractor. The work done has proved beneficial in increasing the depth of water in the channel, and boats now freely pass during any time of tide, when in former years they were obliged to wait until high water to do so.

### WORKS UNDER CONTRACT IN NOVA SCOTIA.

#### *Ingonish.*

The works at Ingonish were brought to completion during November last, and the channel formed now freely admits vessels seeking shelter or otherwise to the pond inside.

#### *L'Ardoise.*

The breakwater described in my report of last year was completed in November. This spring a further quantity of rock ballast was ordered to be placed on the seaward side to further strengthen this structure.

### *St. Peter's Canal.*

Steady progress was made by the contractor during the year on the works for the enlargement of the canal. Coffier dams have been placed at each end, the prism pumped dry, and the work of excavating the under water portions proceeded with. At the close of the fiscal year about one quarter of the work under contract had been completed.

### *Cow Bay.*

The works under contract for repairing the breakwater at Cow Bay were brought to completion in July. In November, during an easterly gale, a portion of the old work was damaged, and in May further damage was done. At the close of the fiscal year the work of repairing was being proceeded with.

## WORKS UNDER CONTRACT IN PRINCE EDWARD ISLAND.

### *Tignish.*

The works of strengthening and repairing the breakwater on the northern side of the entrance to the harbor at this place, were brought to a conclusion in October last. Early this year it was found necessary to raise and repair the breakwater on the southern side, and this work was completed at the end of the fiscal year.

### *Colville Bay.*

The construction of an extension of the breakwater built some years ago by the Local Government at Souris, on the eastern side of Colville Bay, was brought to a conclusion at the end of the fiscal year, and the work thus constructed has been of much benefit to fishing vessels seeking shelter, and also to the inhabitants of the locality in providing facilities for the shipment of produce, as Souris is the last port to close in the fall and first to open in the spring in Prince Edward Island.

## WORKS UNDER DIRECT CHARGE IN NEW BRUNSWICK.

### *Grand Anse.*

This locality is described in my report of last year. The amount appropriated was expended in replacing the work therein mentioned as having been disturbed during a north-east gale. The work, as far as constructed, has proved to be of benefit to the fishermen in that and neighbouring localities.

### *Richibucto.*

At the beginning of the fiscal year it was found necessary to construct brush protection work at high water mark for some distance to the westward of the head of the breakwater, to prevent the sand beach from being cut through behind it. Three and two-thirds acres of land surrounding the head of the breakwater have been purchased by the Department, covering the ground occupied by the beach protection works.

## WORKS UNDER DIRECT CHARGE IN NOVA SCOTIA.

### *Chipman Brook.*

Chipman Brook, Kings Co., is situated on the southern shore of the Minas Channel, Bay of Fundy, about 60 miles to the eastward of Digby Gut. The amount

appropriated has been expended in the construction of a length of 60 feet to the breakwater built many years ago by the inhabitants of the locality, assisted by the Local Government.

*Lingan Beach, C.B.*

Lingan Harbor, at the head of Indian Bay, is on the north-east coast of Cape Breton, and about 12 miles south-east from the entrance to Sydney Harbor.

The amount appropriated has been expended in the construction of brush protection work over a length of 1,900 feet on the sand beach separating Bridgeport Basin from Indian Bay, and through which, during easterly gales, the sea had made several breaches. The results from the work done have proved to be satisfactory.

*Big Tracadie.*

Big Tracadie, Antigonish Co., is a harbor on the southern shore of St. George's Bay, about 10 miles to the westward of the northern entrance to the Strait of Canso. The amount appropriated was expended in repairing the work constructed by the Department in 1874-75, and damaged during a gale in November 1875.

*Musquodoboit.*

Musquodoboit Harbor or Inlet is situated on the south-east coast of Nova Scotia, about 28 miles to the north-east of the harbor of Halifax. The amount appropriated was for the removal of boulders on the bar at the entrance, to enable vessels to enter without waiting for a high tide.

DREDGING.

*The "New Dominion."*

This dredge was operating on Beard's Bar on the Salmon River at the head of Grand Lake, Queen's Co., N.B., at the beginning of the fiscal year, working there until the 12th day of August, and removing 13,720 cubic yards of mud, sand and sawdust. On the 15th of August, work was resumed on the Oromocto Shoals on the St. John River, and continued until the 26th of October, removing 23,000 cubic yards of sand, and completing a cut through the "Shoal" of over a mile in length. Owing to the water having risen so high that further work could not be proceeded with, the dredge and plant were ordered to St. John.

After having been put in repair, dredging was commenced on the 19th of February in connection with the works of the Deep Water Terminus of the Inter-colonial Railway at St. John; and, at the end of the fiscal year, 20,580 cubic yards of sand, gravel and mud had been removed.

*The "Canada."*

At the close of the last fiscal year this dredge was reported as working at Yarmouth, N. S. Operations ceased there at the end of August, the dredge having removed 7,020 cubic yards of blue mud and sand. On 31st of August this dredge arrived at Lunenburg, N. S., and continued the dredging commenced in the year previous, and up to December 28th had removed 20,070 cubic yards of mud and vegetable matter. As it was found necessary to repair the boiler, engine, and dredging gear, this dredge was ordered to St. John; and on the 24th of April, the repairs having been completed, she was ordered to Liverpool, N. S., where she arrived on the 27th, commenced work at once and continued until the 16th of June, removing from the "bar" at the entrance to the harbor, 4,140 cubic yards of sand and sawdust. On the 17th of June she was ordered to Bathurst, N. B., and arrived at Pictou, N. S., on the 20th, when she was placed on the Marine Railway to have

the hull scraped and painted and the hopper doors repaired, this work being in progress at the end of the fiscal year.

*The "Cape Breton."*

As mentioned in my last Report this dredge was employed at Cheticamp, Inverness Co., C.B., at the close of the last fiscal year. Dredging was continued there until the 26th of July removing a further quantity of 8,320 cubic yards of gravel and sand, and completing a channel through the "bar" at the entrance to the harbor, and giving a depth of 9 feet at low water. Between the 7th and 25th of August this dredge operated at Harbor au Bouché, Antigonish Co., N. S., in widening the entrance to that harbor and removing 5,103 cubic yards of sand and gravel. On 1st September dredging commenced off the Intercolonial Railway wharf at Pictou and continued until the 15th, when 6,744 cubic yards of mud had been removed, leaving a depth of 14 feet at low water. On the 15th of September dredging was commenced on the East River of Pictou, and continued until the 30th day of November, removing 26,601 cubic yards of sand, gravel and mud, and a large number of sunken logs. As ice had commenced to make in the river, the dredge was removed to Pictou Landing and hauled up for the winter. On the 20th April work was resumed on the East River, and up to the end of the fiscal year a further quantity of 26,617 cubic yards of the materials before mentioned had been removed.

*The "Prince Edward."*

At the commencement of the fiscal year this dredge was ordered from Charlotte town to Vernon River, Prince Edward Island, where dredging was commenced on the 7th July and continued until the 12th of August, removing 8,760 cubic yards of mud, and completing the work required to the satisfaction of the Harbor Master of the Port. On the 21st of August this dredge commenced working in the Montague River, Kings Co., P. E. I., continuing there until the 9th December and removing 36,480 cubic yards of mud and sand. The river then closing, work was discontinued for the winter and resumed on the 21st of April. At the close of the fiscal year the work was still being proceeded with, a further quantity of 29,220 cubic yards of mud and sand having been removed up to that date.

*The "St. Lawrence."*

At the end of the last fiscal year this dredge was at Pictou, N. S., under sailing orders for Richibucto, Kent Co., N. B., where she arrived on the 5th of July and commenced work on the "bar." Up to the 3rd of August 10,850 cubic yards of sand had been removed, and a depth of 15 feet at low water obtained. On that date she sailed to resume work on the "Horse Shoe Shoal" at the mouth of the Miramichi, which had been discontinued the previous season. Dredging was continued until the 13th of October, removing 21,175 cubic yards of sand. The fall gales having set in, work was stopped, and the dredge sailed for St. John, N.B., arriving on the 14th of November. During the passage she came in collision with a schooner at Hawkesbury, Gut of Canso, sustaining some damage. On her arrival at St. John repairs were at once commenced, and the boiler having shewn signs of weakness, was strengthened to the satisfaction of the Government Inspector of Steamboats. On the 20th of February this dredge was put to work with the "New Dominion" at the Deep Water Terminus of the Intercolonial Railway, and continued until the 19th of April, removing during that period 8,365 cubic yards of mud, sand and gravel.

On the 26th of April this dredge commenced work at Yarmouth, N. S., and was engaged there at the end of the fiscal year, having removed 23,170 cubic yards of blue clay, stones and *débris* from the channel opposite the town.

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SURVEYS AND EXAMINATIONS.

During the year surveys and examinations were made at the following localities; and plans, reports and estimates of the works, have been forwarded.

Antigonish .....	Antigonish Co., N. S.
Clifton .....	Gloucester Co., N. B.
Cow Bay.....	Cape Breton Co., N. S.
Delay's Cove.....	Annapolis Co., N. S.
Gull Cove.....	Charlotte Co., N. B.
Hampton .....	Annapolis Co., N. S.
Malpeque .....	Prince Co., P. E. I.
McNaires .....	Antigonish Co., N. S.
Parrsboro'.....	Cumberland Co., N. S.
Peggy's Cove.....	Halifax Co., N. S.
Petite Rivière.....	Lunenburg Co., N. S.
Port Hood.....	Inverness Co., N. S.
Port Mouton.....	Queens Co., N. S.
Shelburne .....	Shelburne Co., N. S.
Summerville .....	Queens Co., N. S.
Tryon River.....	Prince Co., P. E. I.
West Point.....	Prince Co., P. E. I.
White Head.....	Queens Co., N. S.
Wood Islands.....	Queens Co., P. E. I.

I have the honor to be, Sir,  
Your obedient servant,

HENRY F. PERLEY.

F. BRAUN, Esq., Secretary,  
Department of Public Works,  
Ottawa.



## APPENDIX No. 15.

### PUBLIC WORKS.

#### RAILWAY DEPARTMENT,

ENGINEER'S OFFICE,  
OTTAWA, 4th October, 1877.

SIR,—I have the honor to report on the works upon the Intercolonial Railway for the fiscal year ended 30th June last.

#### CONSTRUCTION OF NEW ROAD.

At the close of the previous fiscal year the section of the line between Moncton and Rivière-du-Loup was in a very unfinished state, but, nevertheless, it was in fair running order, and upon being called on to report upon its condition for traffic purposes, I pronounced it safe for passenger and general traffic, at a moderate rate of speed. Accordingly, on the 2nd July 1876, the entire Intercolonial Railway system was put under traffic. Much work, however, remained to be done to bring this section of the road up to the standard of excellence originally designed by the Chief Engineer, Mr. Fleming. Large stretches of the road had received only a very light lift of ballast. Many of the embankments had wasted away upon the frost leaving them in the spring, reducing the width at formation level below that specified. The Trois Pistoles clay cutting had slid and was in very bad condition, threatening to block the way for the passage of trains. A considerable quantity of work had to be done to guard against the slides filling up the cutting. A large increase to the snow sheds and fences then erected was found necessary to enable the traffic during the winter to be conducted with any degree of regularity. The station houses, engine houses, work-shops, fuel sheds and water services were only partially erected. The extension of the Rimouski pier for the accommodation of the Ocean Mail Service, and the sewer for the drainage of the Moncton yard and buildings were only in preparation for commencement. The siding and yard accommodation previously provided was found to be quite insufficient for the business of the road, and a considerable increase to this service was ordered. The rolling stock also had to be increased for the same reason.

This covers the works ordered to be executed during the fiscal year, on the section north of Moncton.

After organizing a thorough system, the works were pushed forward vigorously and successfully to completion.

Twenty-seven engines and three hundred platform cars were employed in the ballasting service, and experienced division supervisors were put in charge of the work, who, by keeping the rolling stock pretty constantly in motion, enabled me to report the completion of the ballasting and the bringing of the embankments up to the required widths early in November last. By placing an energetic foreman over a good gang of men on the Trois Pistoles clay cutting, the work of flattening the slopes &c., was carried through most satisfactorily early in the autumn. This work

entailed the shifting of about 25,000 cubic yards of very stiff blue clay. It was a work of absolute necessity, as heavy slides threatened to block up the road and impede traffic. It may still be a source of trouble, but I think in future the road master will be able to keep a free passage for trains.

The snow sheds and fences received special attention. Four contracts for this service were awarded early in the season, and one section of the work was carried on by day's wages. The result of the summer's labor in this service was the erection of about seven miles of snow sheds and eleven miles of snow fences. As was anticipated, last winter's working of the traffic proved that a further extension of the snow shed system was necessary.

Active operations were carried on during the season in the construction of buildings and water services, all of which were ready at the setting in of winter for traffic requirement. A further supply of machinery may be necessary, and the water supply at Campbellton will have to be increased by laying pipes for a gravitation service.

The buildings through the Metapedia Valley were not taken off the contractor's hands, in consequence of his not having completed them according to contract. He has, however, since done so.

The building of the extension of the Rimouski pier was commenced by contract, but the contractors did not make satisfactory progress and they were relieved of their contract in December last, having accomplished only about one-fourth of the work, which has since been carried on by day's labor under the supervision of a thoroughly competent man. At the close of the year he was making very satisfactory progress. The structure is strong and substantial and admirably adapted to the purpose for which it is designed.

The brick sewer at Moncton has been laid during the year, and has proved of very great benefit to the railway works.

The work of increasing the siding and yard accommodation along the line was carried forward steadily throughout the summer and was completed in good time to serve the autumn traffic. It entailed the shifting of about 60,000 cubic yards of earth, the laying of a large number of switches and several miles of track.

The rolling stock was increased during the year by the construction of eleven snow ploughs, three flangers, four postal cars, one English mail car, and seven hundred box freight cars. These, it is thought, will be sufficient for the present requirements of the traffic.

Semaphore signals have been established at the stations on this section during the year.

The whole of the work is of a very substantial character, and the new road first class in every respect.

#### STEWIACKE BRANCH.

At Stewiacke, a branch line of about three quarters of a mile in length has been built, leading to the navigable waters of the river Stewiacke.

#### HALIFAX EXTENSION.

The work of extending the railway to North street, in the City of Halifax, consisted of grading, track laying &c., the erection of a handsome brick passenger station, a brick freight house, frame warehouses and sheds, an iron bridge and heavy revetment walls. Mr. S. McKean was the contractor for the grading, &c., and Mr. A. Peters for the erection of the brick station. Both contractors have conducted their works satisfactorily to completion. The rest of the work was executed by day's wages. The work might be said to have been practically finished at the close of the year, though there will necessarily be further expenditure required in heating the building with steam, putting up iron railing and many other minor works. Since the extension has been open for traffic it appears to have given general satisfaction.

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**INCREASED ACCOMMODATION, ST. JOHN.**

During the year the track has been laid and ballasted along Courtenay Bay to the "Ballast Wharf" and a considerable quantity of grading has been done at the ballast heap.

Willmoth Kenedy, contractor for the deep water wharf, has made fair progress with his work, and the dredge has commenced to prepare the bottom for the cribs. This work is under the supervision of Mr. Henry Perley, Superintending Engineer of the Harbors Piers and Rivers in the Maritime Provinces.

In giving a general review of the condition of the entire Intercolonial Railway system I may say, the road is now very nearly "steeled" throughout, the sleeper renewals have received due attention, the drainage of the road bed is improved, the fences are in fair repair, the buildings are in good condition, the water service is generally good, the engine and car stock is in good rolling order, the semaphore system is effective, the repair shops are well supplied with modern machinery and the whole line of railway has been well maintained, and is in fine running condition.

I have the honor to be, Sir,  
Your obedient servant,

**COLLINGWOOD SCHREIBER.**

F. BRAUN, Esq., Secretary,  
Department of Public Works,  
Ottawa.

## APPENDIX No. 16.

### REPORT OF THE CHIEF ARCHITECT.

DEPARTMENT OF PUBLIC WORKS,  
OTTAWA, 26th November, 1877.

SIR,—I have the honor to transmit herewith my report upon the new works, and the repairs made to the Public Buildings under the control of the Department, for the fiscal year ended 30th June, 1877.

### PROVINCE OF ONTARIO.

#### OTTAWA.

##### PARLIAMENT GROUNDS.

Since my last report a large amount of grading, forming roads, crossings, paths, sidewalks, &c., has been done by day's work. A large portion of the sidewalks have been laid with Ewart's patent wood pavement and the balance with gravel.

The grounds generally have been sodded or seeded down and groups of trees planted east and west of the Parliament Buildings, which in a few years, it is expected, will add materially to the beauty of the grounds.

An ornamental summer-house has been built at the north-west side of the Parliament Grounds near the edge of the cliff, thus affording rest and shelter for visitors. Ornamental fences have been built around portions of ground in rear of the Parliament Building used for stacking fuel.

Generally the grounds are now approaching completion, except portion around West Block, as hereafter mentioned.

The ornamental iron gates in front of the East and West Blocks, made by Messrs. Ives & Co., of Montreal, have been fixed in place, and it is intended to have the same decorated at an early date.

Stone crossings have been laid on Wellington and Bank Streets opposite to the several entrances to the Parliament Grounds.

Sketches for the central fountain, also for lamps to the grounds and Wellington Street fence are now being prepared.

The grading of grounds around the West Block and Workshops is now being proceeded with.

Some of the bridges and steps to the Lovers' Walk have been repaired and other minor improvements made around the Parliament Grounds.

The foregoing works have been executed by the Department.

##### PARLIAMENT BUILDINGS.

The adaptation of the old library room and rooms adjoining, for the Supreme Court purposes, mentioned in my last report, has been completed. The Court is 70 feet in length by 35 feet in width, and is fitted with dais, desks and chairs for the Judges, desks and seats for the Counsel &c., and seats for the public.

Adjoining the Court, six rooms have been fitted up for the Judges, with conveniences and rooms for Judges library and Secretary. Private entrance for the Judges is provided at the north east end of building.

The new library is now completed and occupied.

The floor is laid with the following Canadian woods, viz. oak, ash, cherry and walnut, arranged in various ornamental patterns.

The book cases or fittings are executed in pine, richly panelled, moulded and carved, supported by and secured to a skeleton framing of wrought iron.

The book cases are arranged in three tiers against the wall of library, with eight projections or wings: the space between these wings, forming, on the ground floor, small alcoves, are enclosed with a light iron railing on side next central part of library, and each alcove is provided with table, chairs, etc.

The two upper tiers of book cases have projecting galleries, the floors of same being made of glass on iron frames so as to intercept as little of the top light as possible; the gallery fronts have ornamental iron railings.

The galleries are reached by stone staircases on outside of library proper.

The desks, &c., for officers in charge are in the centre of the room so that they command a good view of all parts of the library.

Octagonal reading desks of ornamental character are placed on the floor of library.

The Librarian, Secretary, etc. have offices immediately adjoining to and opening in the library.

The library is heated by fresh air which passes over steam coils in the basement and thence into the library by openings, inside the octagonal reading desks before mentioned for library proper, and by coils of steam pipes in annexes by Messrs. Mitchell and Co., Montreal.

Painting and decoration of library, and Supreme Court, was executed by Mr. McKay, Ottawa.

The upper stages of main tower have been fitted and arranged to receive the clock contracted for by Messrs. Dent of London, England, but owing to delay on their part the clock has not yet been received.

The ordinary and usual repairs have been executed.

All the foregoing works (except such portions otherwise named) have been executed by and under the superintendence of the Department.

#### WEST BLOCK EXTENSION.

Works on this extension have, since my last report, been carried on in accordance with contract, except as to time by the several contractors, and will, it is expected, be completed and fit for occupation this fall, excepting the main tower which will not be fully completed before the fall of 1878.

A full description of this extension will be found in my report for 1875-6.

The heating apparatus, plumbers' work, &c., for the extension is arranged to be done by the Department—that is labor only. Tenders for boiler, pipes, &c., &c., were advertised for and awarded to the following parties, viz: for boiler, Messrs. Inglis and Hunter, Guelph; for steam tubing, G. Reaves, Montreal; lead, Messrs. Robertson and Co., Montreal; marble work, R. Forsyth, Montreal; cast iron steam and water pipes, E. Chanteloup, Montreal; brass fittings, James Morrison, Toronto; radiator castings, Chas. Garth & Co., Montreal.

#### WEST BLOCK DEPARTMENTAL BUILDINGS.

Alterations have been made to certain rooms on each floor of the old portion of building at the north-west angle, where the same joins the new extension; these alterations have been necessitated by the blocking up of windows in the old portion by the erection of the extension.

It is proposed to erect an iron staircase and hoist from basement to attic in the old building and adjoining the extension, thus occupying a space that could not be utilized for offices, and adding to the efficiency of the departmental accommodation; this portion is being done by day's work.

## WORKSHOPS.

Enclosure wall with gateways; drying shed for lumber, 2,450 superficial feet area, and drying house, 27 feet 6 inches by 12 feet 6 inches have been erected.

Contractor for the above works, Mr. F. Jones.

The above adjuncts to the workshops add materially to their convenience.

Drawings for the above prepared, and work superintended by the Department.

## POST OFFICE, CUSTOM HOUSE AND INLAND REVENUE OFFICE.

The sidewalks adjoining this building, on Sparks and Wellington Streets, and the terrace in front of building have been laid with Ewart's wood block pavement.

The terrace wall has been completed and surmounted with cast iron railing. Roadway in rear of building has been formed and fenced in, with gateways to Wellington and Sparks Streets, thus enclosing the property in rear for reception and despatch of mails. Work done by the Department.

## RIDEAU HALL.

Additional rooms connected with kitchen wing and Private Secretary's apartments have been erected.

The supply of gas being found very deficient, it has been determined to erect a gas-holder on the grounds, in rear of the Hall, so that when required, a proper supply can be obtained. Plans and specifications are being prepared by this department and tenders will be called for at an early date.

The usual and necessary repairs have been executed.

## KINGSTON.

Slight and necessary repairs have been executed in connection with Custom House Building and Post Office Building.

A large amount of work has been executed at the fortifications and buildings connected therewith.

The contract work on the Educational Block, and addition to the Military College, is now in progress, and it is expected that the building will be ready for occupation at an early date next year.

This building covers an area of about 1080 superficial yards, with a frontage of 185 feet and mean depth of 64 feet. It is plain in design and substantial in character. The outer walls are built of local limestone with cut stone quoins, plinth, strings and drawings to windows and doors; the stonework is supplied by and cut at the Kingston Penitentiary. The building will be four stories in height, including the basement; basement 10 feet 6 inches high, ground floor 15 feet high, first floor 14 feet 6 inches high; and attic story in mansard 10 feet 6 inches high. Accommodation provided is as follows: one basement floor, boiler room, fuel cellar, cellars, kitchen, scullery, pantries, store rooms, cells, and rooms for Purveyor. On ground floor, dining hall, pantry, servery, water-closets, library, day room, visitors room, clerks office, room for Cadet Captain, Commandant's office, draughting room, Quartermaster's office, pay-office, and Messenger's room. On first floor, lecture room, laboratory, class room, Professors room and store room. On second floor: model rooms, store rooms and class rooms.

The building will be heated by steam, plans for which are now being prepared by this department.

Contractor, Mr. W. Irving, Kingston,

Local architect, Mr. R. Gage.

## TORONTO.

## EXAMINING WAREHOUSE.

A boiler, engine and hoist, the latter capable of carrying a weight of four tons, has been erected in this building.

Plans prepared by this Department.

Contractor, Mr. J. Fensom, Toronto.

## CUSTOM HOUSE.

The building is now occupied and the fence has been erected around same and grounds graded.

## POST OFFICE.

The walls and ceilings of Post Office proper have been colored in distemper.

## GUELPH.

## POST OFFICE, CUSTOM HOUSE AND INLAND REVENUE OFFICE.

A full description of this building appeared in my Report for year 1876.

Contract for same was awarded to Messrs. Dobbie and Grierson, who are now proceeding satisfactorily with the work. It is expected that the building will be ready early next year.

Plans and specifications were prepared by the Department, and work is being executed under the superintendence of Mr. A. Dalgleish, Clerk of works.

Drawings of Post Office, furniture and fittings are now being prepared.

## LONDON.

## CUSTOM HOUSE.

Extra accommodation having been required for the Inland Revenue Department, viz: offices for inspector of gas, weights and measures, it was found necessary to erect additional rooms over the present examining warehouse.

Plans and specifications were prepared by this Department, and the contract awarded to Messrs. Wright and Durand, London.

Local architects, Messrs. Peters and Son.

## MILITARY GROUNDS,

Plans and specifications were prepared by this Department for fuel sheds and fencing. Contract awarded to Messrs. J. C. Dodd and Son, London, who completed the work in a satisfactory manner.

Local architects, Messrs. Peters and Son.

## PROVINCE OF QUEBEC.

## MONTREAL.

## EXAMINING WAREHOUSE.

This building is roofed in and contract work will it is expected, be completed this fall.

Plans and specifications for boiler, engine, hoisting machinery, &c., are now in course of preparation by this Department, and contracts for same will be let at an early date.

Contractors, Messrs. Bourgeoin and Lamontagne.

Architects, Messrs. Bourgeau and Leprohon, of Montreal.

Usual and necessary repairs have been executed at the Custom House and Inland Revenue offices.

## ST. HELEN'S ISLAND.

Repairs considered necessary have been executed.

## PENITENTIARY ST. VINCENT DE PAUL.

Plans have been prepared by this Department for extensive additions to the penitentiary proper. In the meantime 60 stone cells have been erected; also, a barn with root cellar under.

The work on barn is now in progress, being done by the convicts under the superintendence of the Prison Instructor and direction of the Supervising Architect, Mr. John Bowes.

The additions to Penitentiary are to be erected in rear of, and adjoining the present building, one portion of which forms a large guard hall 60 feet square and 45 feet high to the springing of the roof. This hall is lighted by windows at each angle and by dormers in the roof. In the centre of this hall is the main smoke shaft surrounded by four ventilation flues, the whole being 14 feet in diameter. Around the shaft and flues iron staircases are arranged, leading to two galleries, which are at same level as galleries to cells in wings hereafter described. The basement beneath the large hall is arranged for boiler house and fuel stores.

From three sides of large hall (the fourth being against the old portion) wings 120 feet long by 48 feet wide project, two of these wings have each three tiers of 44 cells on each floor, making a total of 264.

The cells are built disconnected from the outer walls by a corridor 10 feet wide around each of the cell wings. The two upper tiers of cells open upon narrow galleries on same levels as those in large hall.

### ST. JOHN'S.

#### CUSTOM HOUSE, POST OFFICE AND CANAL OFFICE.

Plans and specifications for this building have been prepared by the Department. Tenders for the erection of same will be asked for at an early date.

### THREE RIVERS.

The necessary fences and out buildings for the Custom House &c., are now in progress.

### QUEBEC.

#### FORTIFICATIONS, QUEBEC; AND FORTS, LEVIS.

During the past year a large amount of necessary repairs have been done, principally by day's work. They were of such a nature that contracts could not be entered into, as they consisted of a variety of small works, the extent of which could not be easily ascertained.

Local superintendent of works, Mr. J. B. Bertrand.

## PROVINCE OF NEW-BRUNSWICK.

### DORCHESTER.

#### PENITENTIARY FOR MARITIME PROVINCES.

Tenders were asked in 1876 for the erection of this building, and contract awarded to Mr. A. McKenzie. A description of the building was given in my last report.

Owing to bad quality of ground it was considered necessary to carry foundation walls down to a solid foundation, if this work had not been required progress would have been greater; at present time, walls of main building and cells are level with the surface—work on the same is now being proceeded with satisfactorily.

Drawings and specifications prepared by this Department. Local Architect, Mr. M. Stead, St. John, N.B. Contractor, Mr. Alexander McKenzie.



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## PROVINCE OF NOVA SCOTIA.

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### PICTOU.

#### CUSTOM HOUSE.

Since my last report this building has been completed and occupied by the various local offices for whose use it was erected.

It measures 53 feet by 48 feet, three stories in height, with a projection in rear, 16 feet by 13 feet which is four stories in height. The style of architecture adopted is simple but effective. The foundations, basement walls and dressing, throughout, are of stone, while the remainder of the walls are of brick.

The basement story is appropriated for examining warehouse, tide waiters room, furnace room, fuel room and water closets; the ground floor for long room, Collector's room, Locker's room and room for Standard weights and measures—while on the first floor are the shipping office, Inland Revenue office, waiting room, ante-room and Collector's room.

Local Architects, Stirling and Dewar, Halifax.

Contractors, Messrs. W. L. & J. A. Dodge.

### HALIFAX.

In the Dominion Building a new boiler is arranged for and the heating apparatus reconstructed where found deficient. Other necessary repairs have been executed.

Local Architect, Mr. Elliott.

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## PROVINCE OF PRINCE EDWARD ISLAND.

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### CHARLOTTETOWN.

It having been found necessary for the proper economical heating of the Dominion Building, to provide a new boiler and steam heating apparatus with brick smokestack. These works were carried out under the direct superintendence of officers of this Department.

The usual and necessary repairs in connection with this building have also been done.

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## PROVINCE OF MANITOBA.

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### WINNIPEG.

#### CUSTOM HOUSE, POST OFFICE, LANDS AND REVENUE OFFICES.

The fittings and furniture for the Post Office and Revenue Offices and the necessary sheds and fences required for the various buildings, have been completed and occupied.

Local Architect, Mr. J. P. M. Lecourt. Contractor, Mr. Jos. Wood.

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## STONY MOUNTAIN.

### PENITENTIARY.

This building has been completed and occupied. The stockade fence surrounding the building lately used as a penitentiary at Stone Fort, was taken down and removed to the new penitentiary to be utilized there. Three buildings erected and used by the Contractors while carrying on their works were purchased and have been converted into quarters for the keepers.

The various works have been carried out under the superintendence of the Department.

Contractors, Messrs. Morrison and Barclay, Guelph, Ontario.

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## BRITISH COLUMBIA.

### WESTMINSTER.

#### PENITENTIARY.

The contract for this building has been completed. Plans and specifications have been prepared for the necessary fittings and furniture which are now being manufactured. Arrangements are now in progress for supplying the building with water from a high level.

Local Architect, Hon. B. W. Pearce.—Contractors Messrs. Kinsman and Styles

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## NORTH-WEST TERRITORIES.

### BATTLEFORD.

The residence of the Lieutenant Governor will, it is expected, be completed and ready for occupation by the end of October 1877. This building has foundations of masonry and walls constructed of hewn logs put up "Red River Style," the joints being filled up with lime and sand. The inside of walls are strapped, lathed and plastered. The outside of building is strapped, clap-boarded and painted. The roofs are covered with sawn shingles, eaves finished with bracketted corners. The internal finish throughout is good. The accommodation provided consists of a Reception Room 50 feet by 30 feet; a Dining Room 24 feet by 16 feet; a Drawing Room 24 feet by 16 feet; a Parlor 15 feet by 16 feet. The last three rooms are so arranged with large folding doors between that when so required they form one large room. An office 13 by 12 feet; a large entrance hall; a hat and cloak room; a kitchen; a summer kitchen; a pantry; a large cellar; and eight bed-rooms, the largest being 24 feet by 16 feet, and the smallest 15 feet by 9 feet 6 inches.

The residences for Stipendiary Magistrate, Registrar and resident Clerk of the Council, it is expected, will be completed by the middle of October 1877.

The residence for the Stipendiary Magistrate provides accommodation as follows: a dining room, a parlour, an office, six bed rooms, a kitchen, a cellar and a pantry.

The residence for Registrar consists of a dining room, a parlour, four bed rooms, a kitchen, a pantry, &c.

The Clerk of the Council's residence has a dining room, a parlour, three bed rooms, a cellar, a kitchen, a pantry, &c. Construction of the above is similar in materials and workmanship to the Lieutenant Governor's residence.

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**REGISTRY OFFICE.**

The walls of this building are of brick, on stone foundations; size of building, 43 feet by 24 feet, divided into three rooms, two for storage of deeds (one of these being vaulted and fireproof) and the remaining one for an office.

The doors throughout are to be of iron, and the windows protected by iron guard bars and shutters.

**COMMANDANT'S QUARTERS, ETC., ETC.**

It is expected that the Commandant's residence and the buildings required will be ready by the end of October, 1877.

The accommodation provided for the Commandant consists of a dining room, a parlor, three bed rooms, a kitchen, a summer kitchen, a cellar, a pantry, &c. The construction is similar in materials and workmanship to the other official residences.

I have the honor to be

Sir,

Your obedient servant,

THOS. S. SCOTT,

*Chief Architect.*

F. BRAUN, Esq.,  
Secretary,  
Department of Public Works.

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## APPENDIX No. 17.

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### GENERAL STATEMENT SHOWING :

- 1st. Water Power and other Public Property leased on Canals, &c., during the year ended 30th June, 1877.
  - 2nd. Property purchased or sold by the Department, during the fiscal year.
  - 3rd. Property declared to be no longer under the control of the Department.
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## GENERAL STATE

*1st. Water Power and other Public Property leased on*

Date.	Term of Lease.	Lessees.	Property Leased.	For what purpose Leased.
July 19, 1876	Pleasure of Government.	Robt. E. Hardy .....	Part of Rideau Canal Reserve, on lots 22, 23, Con. A, Nepean.	Pasture .....
Jan. 20, 1877		Chas. McCaffrey .....	Part of Rideau Canal Reserve, on lot S $\frac{1}{2}$ 4, 2nd Con., Nepean.	Farming .....
Sept. 4, 1876		R. W. Baxter .....	Part of Rideau Canal Reserve, on lot G, Con. C, Nepean.	Gardening .....
Aug. 18 "		Henry Jackson .....	Part of Rideau Canal Reserve, on lot B, Con. C, Nepean.	" .....
Dec. 13 "		Geo. May .....	Part of Rideau Canal Reserve, on sub-lots 29, 30, of lot K, Con. B and wharf privilege, Nepean.	Wharfage .....
April 3, 1877		Thos. O'Neil .....	Part of Rideau Canal Reserve, on lot I, Con. B, Nepean.	Gardening .....
Mar. 31 "		Wm. Powell .....	Part of Rideau Canal Reserve, on lot N $\frac{1}{2}$ 5, 2nd Con., Nepean.	Farming .....
April 3 "		John Blair .....	Part of Rideau Canal Reserve, on lot N $\frac{1}{2}$ 6, 2nd Con., Nepean.	" .....
June 12 "		Daniel Delaney .....	Part of Rideau Canal Reserve, on lot S $\frac{1}{2}$ 8, 2nd Con., Nepean.	" .....
" 12 "		Michael Kilroe .....	Part of Rideau Canal Reserve, on lot N $\frac{1}{2}$ 8, 2nd and 1st Con., Nepean.	" .....
" 13 "		Wm. Rowland .....	Part of Rideau Canal Reserve, on lot N, Con. B, Nepean.	" .....
" 7 "		T. & P. Collins .....	Part of Rideau Canal Reserve, on lot 9, 1st Con., Gloucester.	" .....
" 25 "		H. Hartney .....	Part of Rideau Canal Reserve, on sub-lots 64, 65, of lot I, Con. B (R. F.), Nepean.	Tilling & gardening.
Aug. 8 "		A. Howlett, widow ..	Part of Rideau Canal Reserve, on lot 40, 1st Con., Nepean.	" .....
July 21, 1876		A. Quackenbush .....	Part of lot 23, 2nd Con., Grant-ham, at George's Point, or Mar-undale Point, Welland Canal.	Pleasure ground...
" 20 "		Her Majesty .....	Release by J. M. & J. Walker to Government, cancelling lease of their property, St. John, N.B.	Post Office .....
Feb. 3, 1877		N. F. Birely .....	Part of Government Reserve on Burlington Beach.	Hotel, Burlington Bay.
Oct. 14, 1876		Bridget Perry, widow	" .....	" .....
Jan. 20, 1877		J. C. McKeaud .....	" .....	" .....
Aug. 2 "		R. N. Walsh .....	Wharf lot at Valleyfield, above Guard Lock.	Beauharnois Canal
Mar. 29 "		H. Holbrook .....	Three sheds and a cottage at the camp, New Westminster, B.C.	.....
Oct. 14, 1875		A. Peele .....	Part of Assay Office at the camp, New Westminster, B.C.	.....
Dec. 1 "		J. Maury .....	" .....	.....
Dec. 28, 1876		* E. Dickenson .....	Government House and Entrance Cottage, New Westminster, B.C.	.....
Sept. 6 "		H. Pruneau .....	To attach his boat-house to shore Ordnance Property, south side Cathcart Street, Ottawa River.	Pleasure boats.....
April 7, 1877		Corporation and Water Commissioners, City St. Catharines	To lay main pipe of water works across Welland Canal and Government Lands, St. Catharines.	Welland Canal ....

\* Term of lease, one year.

## MENT SHOWING:

*Canals, &c., during the Fiscal Year ended 30th June, 1877.*

Amount of water power Leased.	Area of property Leased.	Date from which Lease is reckoned.	Annual Rental.	Terms of payment.			Remarks.
				Amount of each instalment.	When payable each year.	When first Instalment was due.	
.....	8 acres.	June 6, 1876	\$12 00	\$12 00	January 1 .....	On delivery of lease.	First payment \$6, up to 1st January, 1877.
.....	15 " .	Jan. 1 " "	11 25	11 25	" .....	"	
.....	2 r. 30 p.	Date of lease	1 00	1 00	" .....	"	50cts. for first half year
.....	900 feet.	" ...	1 00	1 00	" .....	"	Stewart's property.
.....	1 acre ..	" ...	2 00	2 00	" .....	"	
.....	6 acres.	Jan. 1, 1877..	9 00	9 00	" .....	"	
.....	11 " .	" 1 " "	8 25	8 25	" .....	"	This cancels lease of 18th January, 1876.
.....	10 " .	" 1 " "	7 50	7 50	" .....	"	" "
.....	6 " .	" 1 " "	4 50	4 50	" .....	"	" "
.....	11 " .	" 1 " "	8 25	8 25	" .....	"	This cancels lease of 26th February, 1876.
.....	4 " .	June 1, 1877.	3 00	3 00	June 1.....	"	
.....	6 " .	" 1 " "	4 00	4 00	" .....	"	
.....	" 1 " "	" 1 " "	1 00	1 00	" .....	"	
.....	1/4 acre....	July 1, 1877..	2 00	2 00	July 1.....	"	
.....	3 1/2 acres.	" 1, 1876..	25 00	25 00	" .....	"	A bathing building.
.....							\$800 for residue of term.
.....		Jan. 1, 1877..	100 00	100 00	January 1 .....	Jan. 1, 1877.	This cancels lease of 19th April, 1876.
.....		" 1, 1876..	100 00	100 00	" .....	" 1, 1876.	
.....		" 1, 1877..	10 00	10 00	" .....	" 1, 1877.	
.....	100 feet front.	Aug. 1 " "	23 00	23 00	August 1.....	On delivery of lease.	
.....		Mar. 1 " "	{ 120 00 }	12 00	1st day of each month.		
.....		Oct. 1, 1875..	{ 24 00 }	15 00	1st day of each quarter.		
.....		Dec. 1 " "	36 00	9 00	"		
.....		Mar. 31, 1877	120 00	30 00	"		
.....	100 x 50 feet.	Sept. 1, 1876	1 00	1 00	May 1 .....	On delivery of lease.	
.....			Free.				

2nd.—Property purchased or sold by the Department during the Fiscal Year ending 30th June, 1877.

Date.	Vendors.	Purchasers.	Property purchased or sold.	For what purpose used.	Area of Land.	Price of Sale.	Remarks.
July 18, 1876	J. W. Holmes.....	Her Majesty.....	Release for damages } Dunnville Dam, Welland Canal.	Lots 19, 20, 21 Dunnville Damages		\$ cts.	
" 14, 1876	H. Robb.....	"	"	" 9		350 00	
" 14, 1876	W. T. Robb.....	"	"	" 18		50 00	
" 15, 1876	Wm. G. Scott.....	"	"	" 6, 7		50 00	
" 15, 1876	H. Penn.....	"	"	" 10		100 00	
" 14, 1876	E. & E. A. Blott.....	"	"	" 15		50 00	
" 15, 1876	S. Lawson.....	"	"	" 11		50 00	
" 14, 1876	A. Vasilinder.....	"	"	S. part lot 16, 4th Con., S. Cayuga.....		100 00	
August 5, 1876	Eliz. B. Gardiner.....	"	"	Lot 32, 2nd Con., N. Cayuga.....	6½ acres.	450 00	
" 8, 1876	Sarah Fradenburgh.....	"	"	Lots 21, 22, 3rd Con., S. Cayuga.....		15 00	
" 1, 1876	Ed. Martin.....	"	"	Lot 1, town of Cayuga. S. part lot 24, 3rd Con., S. Cayuga.....		20 00	
" 8, 1876	C. B. Fradenburgh.....	"	"	S.E. part lot 19, 3rd Con., S. Cayuga.....		125 00	
" 4, 1876	Eliz. Hoppell et vir.....	"	"	Lot 1, N. Cayuga.....		15 00	
" 5, 1876	Geo. Parsons.....	"	"	N. part S. half lots 28, 29, 30, 1st Con., N. Cayuga.....		25 00	
" 5, 1876	Wm. McFarlane.....	"	"	N. part lot 2, town of Cayuga.....		180 00	
" 5, 1876	Chas. Parson.....	"	"	Part lots 19, 20, 3rd Con., S. Cayuga.....		40 00	
" 5, 1876	Geo. Gifford.....	"	"	Centre part lot 4, N. Cayuga.....		150 00	
" 7, 1870	John Bradt.....	"	"	N. part lots 31, 32, 33, 1st Con., N. Cayuga.....		70 00	
" 7, 1876	John Garvey.....	"	"	Lot 7, town of Cayuga. Lot 4, town of Dunnville. Lots 20, 23, 31, 2nd Con., N. Cayuga.....		180 00	
" 5, 1876	Ed. Campbell.....	"	"			45 00	
" 7, 1876	David Thompson.....	"	"			50 00	
" 5, 1876	John McCormell.....	"	"			50 00	
						450 00	

"	4, 1876	Edith Gibson.....	"	"	"	N. half lot 2 and W. half lot 4, N. Cayuga.....	40 00
"	5, 1876	Geo. Lishman.....	"	"	"	S. part lots 28, 29, 30, 1st Con., N. Cayuga.....	600 00
"	5, 1876	H. N. Misenor.....	"	"	"	Lot 6, Canborough.....	30 00
"	7, 1876	Narg & R. Beasley	"	"	"	Lot 4, town of Cayuga.....	10 00
"	8, 1876	D. McMullen.....	"	"	"	Lots 8, 9, town of Cayuga.....	75 00
"	7, 1876	J. W. Fradenburgh	"	"	"	Part lots 20, 21, 3rd and 4th Con., S. Cayuga.....	150 00
"	8, 1876	D. Campbell.....	"	"	"	Lot 6, town of Cayuga.....	50 00
"	8, 1876	T. H. Darling.....	"	"	"	Part lots 3, 4, Canboro'.....	80 00
"	8, 1876	Gilbert Young.....	"	"	"	Part of Jones' Tract, N. Cayuga.....	5 00
"	8, 1876	Wm. H. Lambier...	"	"	"	Part of Jones' Tract, N. Cayuga.....	6 90
"	4, 1876	S. Darling et al.....	"	"	"	W. part lot 1, and part lot 2, Canborough.....	1,352 00
July	29, 1876	S. Meyer.....	"	"	"	West half lot 7, 4th Con., S. Cayuga.....	30 00
"	29, 1876	J. & W. E. Johnson	"	"	"	Lot 4, 5, Canborough.....	240 00
"	29, 1876	E. Logan.....	"	"	"	S. part Lot 4, 2nd Con., Dunnville.....	100 00
"	29, 1876	J. Hamilton.....	"	"	"	S. part lots 8, 9, 2nd Con., Dunnville.....	105 00
"	29, 1876	Wm. McBay.....	"	"	"	S. part lot 7, and E. half of N. half lot 8, 2nd Con., Dunnville.....	20 00
"	29, 1876	R. Logan.....	"	"	"	S. half lot 6, 2nd Con., Dunnville.....	130 00
"	29, 1876	J. Boose.....	"	"	"	W. part of S. part lot 15, 4th Con., S. Cayuga.....	60 00
"	29, 1876	J. Rittenhouse.....	"	"	"	W. part lot 3, 3rd Con., Dunnville.....	30 00
"	31, 1876	A. Dickson.....	"	"	"	E. part of N. half lot 6, 2nd Con., Dunnville.....	10 00
"	31, 1876	A. Dickson .....	"	"	"	S. half lot 6, 2nd Con., Dunnville.....	30 00
"	31, 1876	J. G. Winslow.....	"	"	"	E. 100 acres of lot 1, Canborough.....	680 00
"	31, 1876	Emma Darling.....	"	"	"	Part lots 4, 5, Canboro'.....	80 00
"	31, 1876	O. Burham and E. Evans.....	"	"	"	N. part lot 15, 4th Con., S. Cayuga.....	45 00
"	31, 1876	Geo. W. Messmore.	"	"	"	Part lots 4, 5, Canboro' East half lot 7, 4th Con., S. Cayuga.....	50 00
"	31, 1876	B. Alair.....	"	"	"	Lots 8, 9, 4th Con., S. Cayuga.....	40 00
"	31, 1876	Chas. Edie.....	"	"	"	.....	40 00



## 2nd.—Property purchased or sold by the Department, &amp;c.—Continued.

Date.	Vendors.	Purchasers.	Property purchased or sold.	For what purpose used.	Area of Land.	Price of Sale.	Remarks.
July 31, 1876	Geo. Wright .....	Her Majesty .....	Release for damages } N. part of S. part Dunnville Dam, } lot 6, 3rd Con., N. Weiland Canal. } Cayuga .....			\$ cts.	
August 1, 1876	A. M. Burham <i>et vir</i>	" .....	Part lots 8, 9, Canboro'.	Damages .....		100 00	
July 31, 1876	U. Rittenhouse .....	" .....	Part of S. part lot 2,	" .....		90 00	
" 31, 1876	Wm. Quider .....	" .....	2nd Con., Dunnville	" .....		50 00	
August 4, 1876	E. E. Armour <i>et vir</i>	" .....	Lots 14, 16, town of	" .....		100 00	
" 4, 1876	S. Auger <i>et vir</i> .....	" .....	Dunnville .....	" .....		150 00	
July 29, 1876	Wm. Dashwood .....	" .....	Lots 26, 27, 28, town of	" .....		15 00	
August 3, 1876	D. Auger .....	" .....	Dunnville .....	" .....		110 00	
" 3, 1876	V. Maul .....	" .....	Part of W. part of N.	" .....		15 00	
" 3, 1876	J. Fawcett .....	" .....	half lot 6, 2nd Con.,	" .....		30 00	
" 3, 1876	W. H. Griffin .....	" .....	Dunnville .....	" .....		60 00	
July 31, 1876	Jos. Lovegrove .....	" .....	N.-W. part lot 13 and N.	" .....		150 00	
" 31, 1876	R. F. Lattimore .....	" .....	part lot 13, 4th Con.,	" .....		60 00	
" 1, 1876	W. H. Johnson .....	" .....	S. Cayuga .....	" .....		150 00	
" 4, 1876	C. T. Meadows .....	" .....	W. part of N. part lot	" .....		60 00	
July 31, 1876	E. Allair (Widow)	" .....	8, 2nd Con., Dunn-	" .....		50 00	
" 31, 1876	E. Allair (Widow)	" .....	ville .....	" .....		100 00	
" 31, 1876	E. Allair (Widow)	" .....	E. part of N. part lot 7,	" .....		60 00	
" 31, 1876	E. Allair (Widow)	" .....	2nd Con., Dunnville	" .....		50 00	
" 31, 1876	E. Allair (Widow)	" .....	N. part lot 9, 1st Con.,	" .....		100 00	
" 31, 1876	E. Allair (Widow)	" .....	Dunnville .....	" .....		60 00	
" 31, 1876	E. Allair (Widow)	" .....	E. part lot 2 and N. part	" .....		10 00	
" 31, 1876	E. Allair (Widow)	" .....	lot 8, 2nd Con.,	" .....		60 00	
" 31, 1876	E. Allair (Widow)	" .....	Dunnville .....	" .....		10 00	
" 31, 1876	E. Allair (Widow)	" .....	E. part of S. part lot	" .....		60 00	
" 31, 1876	E. Allair (Widow)	" .....	15, 4th Con., S.	" .....		50 00	
" 31, 1876	E. Allair (Widow)	" .....	Cayuga .....	" .....		100 00	
" 31, 1876	E. Allair (Widow)	" .....	Lot 1, town of Dunnville	" .....		60 00	
" 31, 1876	E. Allair (Widow)	" .....	S. part lot 9, 3rd Con.,	" .....		50 00	
" 31, 1876	E. Allair (Widow)	" .....	and lot 9, 4th Con.,	" .....		100 00	
" 31, 1876	E. Allair (Widow)	" .....	N. Cayuga .....	" .....		60 00	
" 31, 1876	E. Allair (Widow)	" .....	Lot 20, 21, 3rd Con., S.	" .....		10 00	
" 31, 1876	E. Allair (Widow)	" .....	Cayuga .....	" .....		60 00	
" 31, 1876	E. Allair (Widow)	" .....	Part lots 4, 5, 3rd Con.,	" .....		10 00	
" 31, 1876	E. Allair (Widow)	" .....	Dunnville .....	" .....		10 00	

"	21, 1876	O. V. Davis et al.	"	"	W. part of E. half of lot 6, 3rd Con., N. Cayuga.....	"	"	20 00
"	21, 1876	S. M. Davis et al.	"	"	E. part lot 1 and S. half lot 6, 3rd Con., N. Cayuga.....	"	"	30 00
August 3, 1876	W. J. Atkins.....	"	"	"	N. part of W. part lot 13, 1st Con., Dunnville.....	"	"	15 00
"	3, 1876	R. Armour.....	"	"	N. half lots 10, 11, 1st Con., Dunnville.....	"	"	600 00
"	3, 1876	A. Armour ..	"	"	Lots 10, 11, 2nd Con., Dunnville.....	"	"	75 00
"	3, 1876	M. Gifford.....	"	"	E. part of N. half lot 5 and S. part of W. part lot 6, 2nd Con., Dunnville.....	"	72 acres	40 00
"	1, 1876	E. Lee et al, Executors of Atkins' Estate.....	"	"	W. part of N. part lot 8, 2nd Con., Dunnville Lot 2, town of Dunnville	"	"	25 00
"	2, 1876	E. & N. Arderly ..	"	"	All lands within village of Dunnville.....	"	"	50 00
"	2, 1876	Municipal Council of Dunnville.....	"	"	Centre part lot 7, Canborough ..	"	"	1,500 00
"	2, 1876	H. B. Briggs.....	"	"	Part of lot 1, town of Cayuga.....	"	"	180 00
"	2, 1876	A. M. Kinneer.....	"	"	Part of lot 1, Huff Tract; part of lots 4, 5, Jones' Tract; Gore between these tracts, N. Cayuga.....	"	"	110 00
"	3, 1876	W. Teasdale.....	"	"	Lot 6, 4th Con., S. Cayuga.....	"	"	300 00
"	1, 1876	C. Brown (Widow)	"	"	E. half of N. half lot 8, 1st Con., Dunnville.	"	"	100 00
"	1, 1876	A. Lynch.....	"	"	Part lot 9, Canborough..	"	"	30 00
"	3, 1876	A. Low. ....	"	"	N. part lots 12, 13, 1st Con., Dunnville.....	"	"	20 00
"	1, 1876	E. Lee, Executor of Beatty Estate.....	"	"	Part lot 5, Canborough.	"	"	60 00
Oct. 25, 1876	A. M. & A. C. Burnham.....	"	"	"	" 8, 9 "	"	"	25 00
"	21, 1876	A. Burnham ..	"	"	" 8, 9 "	"	"	45 00
"	27, 1876	J. C. Alair & J. P. Islip.....	"	"	" 8, 9 "	"	"	55 00
"	25, 1876	H. F. Midaugh....	"	"	" 10 "	"	"	30 00
"	25, 1876	J. J. Dockstader...	"	"	" 11 "	"	"	40 00
"	25, 1876	Wm. Quider.....	"	"	" 12 "	"	"	60 00
"	25, 1876	M. Lymburner .....	"	"	" 13, &c. "	"	"	60 00

## 2nd.—Property purchased or sold by the Department, &amp;c.—Continued.

Date.	Vendors.	Purchasers.	Property purchased or sold.	For what purpose used.	Area of Land.	Price of Sale.	Remarks.
Oct. 26, 1876	J. Lymburner.....	Her Majesty.....	{Release for damages} H. Lymburner's Dunnville Dam, farm, Canbo- Welland Canal. rough.....			\$ cts.	
" 27, 1876	Municipal Council of North Cayuga.....	"	Lands, &c., N. Cayuga.....	Damages.....	.....	4 00	
" 26, 1876	John Murphy.....	"	S. part lot 13 ".....	"	.....	518 00	
" 26, 1876	Wm. Bruce.....	"	S. part lot 12 ".....	"	.....	10 00	
" 27, 1876	G. H. Windecker.....	"	Part lot 18 ".....	"	.....	10 00	
" 23, 1876	J. E. Reese & Wm. Walters.....	"	"	"	.....	10 00	
" 27, 1876	E. B. Gardiner.....	"	"	"	.....	40 00	
" 27, 1876	Executors of R. V. Griffith.....	"	"	"	.....	15 00	
" 28, 1876	Municipal Council of South Cayuga.....	"	"	"	.....	250 00	
" 25, 1876	P. P. Tofford.....	"	"	"	.....	200 00	
" 21, 1876	Edward Evans.....	"	"	"	.....	180 00	
" 26, 1876	Municipal Council of the village of Cayuga.....	"	"	"	.....	15 00	
" 26, 1876	D. McMullen & J. Walsh.....	"	"	"	.....	200 00	
" 23, 1876	J. E. Johnson and J. Nicholson.....	"	"	"	.....	50 00	
" 23, 1876	J. P. Merritt.....	"	"	"	.....	350 00	
" 23, 1876	J. S. Maor.....	"	"	"	.....	25 00	
" 21, 1876	Municipal Council of the township of Dunnville.....	"	"	"	.....	50 00	
		"	"	"	.....	300 00	

"	26, 1876 H. Rittenhouse..... 26, 1876 E. Brady, O. Kellogg, S. H. Rittenhouse, C. O. Burham.....	"	"	Part lots 2, 4, 3, 4 Con., township Dunnville.	"	30 00
"	"	"	"	"	"	315 00
"	25, 1876 H. Grier.....	"	"	Part lots 4, 5, 6, 3rd Con., township Dunnville. N. part of W. corner of lot 6, 2nd Con., township Dunnville. N.-W. corner of lot 6, 2nd Con., Dunnville Lots 10, 11, 12, Jones' Tract, N. Cayuga....	"	10 00 5 00 40 00
"	21, 1876 U. Rittenhouse.....	"	"	"	"	1,000 00
"	31, 1876 B. & E. Baxter..... Nov. 4, 1876 Municipal Council of the township of Canborough.....	"	"	"	"	150 00 150 00 150 00 100 00
Jan. 10, 1877	B. Blair .....	"	"	Lands, roads, bridges, &c., Canborough..... Part of Island in front of lots 6, 7, 4th Con., S. Cayuga, and lot 1, 3rd Con., Dunn- ville..... Lot 17, 3rd Con., N. Cayuga..... Lots 22, 23, 24, south of Main St., Dunnville Lot D., north of Main Street, Dunnville....	"	25 00
"	16, 1877 Charlotte Hurley .. " 17, 1877 Bank of Upper Canada (Estate) March 12, 1877 } D. & W. & W. A. Dec. 22, 1876 } McGrea..... March 5, 1877 Grand Trunk Rail- way Co., per R. Wright, Treas..... Feb. 13, 1877 County of Haldi- mand.....	"	"	"	"	100 00 25 00
March 15, 1877	Jos. Lovegrove.....	"	"	N.-W. half lot 3, south of Main St., Dunnville County Court House grounds, village of Cayuga..... S. part lot 14, 4th Con., S. Cayuga..... Lot 3, Jones' Tract, N. Cayuga..... Lot 1, Jones' Tract, N. Cayuga..... Lot 13 village Dunnville Lots 12, 13, south of Main St., Dunnville. Lot 17, south of Main Street, Dunnville.... Part lot 6, Jones' Tract, N. Cayuga.....	"	100 00 35 00 400 00 30 00 50 00 100 00 50 00 6 00
"	17, 1877 Robt. Gleuny.....	"	"	"	"	50 00
June 6, 1877	New England Co.....	"	"	"	"	50 00
"	9, 1877 C. McNeal..... " 4, 1877 Merritt Estate .....	"	"	"	"	6 00
"	4, 1877 Estate T. O. Street	"	"	"	"	50 00
"	5, 1877 Romain Smith .....	"	"	"	"	6 00
"	7, 1877 Bank of Upper Canada Estate.....	"	"	Part lot 5, south of Main Street, Dunnville....	"	50 00

## 2nd—Property purchased or sold by the Department, &amp;c.—Continued.

Date.	Vendors.	Purchasers.	Property purchased or sold.	For what purpose used.	Area of Land.	Price of sale.	Remarks.
June 11, 1877	Six Nations Indians per J. E. Gilkison	Her Majesty.....	Release for damages } N. part lot 9, 2nd Dunnville Dam, } Welland Canal.	Damages .....		\$ cts.	
" 11, 1877	do ..	" .....	" Land both sides Grand River, south of Philip & Chippewa Streets, village of Cayuga....	" .....		75 00	
" 11, 1877	do ..	" .....	" Lots 5, 11, 12, 13, east of Oneida Street; lots 1, 2, 3, 4, east of Delaware Street, and lot 3, west of Oneida Street, town of Cayuga .....	" .....		175 00	
" 9, 1877	Hurrell Estate.....	" .....	" E. part lot 10, east of Oneida St., Cayuga	" .....		217 00	
Dec. 1, 1875	Jane Parke.....	" .....	Deed of lot No. 1, village of Port Colborne	Welland Canal Enlargement		25 00	
June 17, 1876	Pat. Nihan et al.....	" .....	" 17, 3rd Con., Grantham .....	" .....	0-35 acres.	300 00	
" 17, 1876	do ..	" .....	" 18 " " .....	" .....	1-15 "	345 00	
Aug. 11, 1876	J. W. Seymour.....	" .....	Release damages to lot 11, 6th Con., and lot 12, 7th Con., Grantham.....	" .....	4-18 "	1,455 00	
June 3, 1876	John Brown .....	" .....	Release damages to lot 5, 10th Con., Grantham .....	" .....		1,100 00	By cutting fences
" 3, 1876	do ..	" .....	Release damages to lot 1 in Gore of Thorold .....	" .....		280 00	To crops & fences
Sept. 5, 1876	Pat. Cadfrey .....	" .....	" 11, 8th Con., Grantham .....	" .....		50 00	" "
July 8, 1876	R. Wightman et al.	" .....	Deed of part of lot 203, broken front, Thorold .....	" .....		750 00	By cutting his farm in two.
Sept. 8, 1876	M. Crawford ..	" .....	" 15, " " .....	" .....		175 00	
" 5, 1876	do ..	" .....	" 18, 19, 20, 8th and 9th Con., Grantham .....	" .....	1-45 acres.	75 00	
" 5, 1876	do ..	" .....	Release damages to lots 18, 19, 20, 8th and 9th Con., Grantham by overflowing them.....	" .....	0-09 "	500 00	To overflow them
" 25, 1876	B. F. Reynolds.....	" .....	Release damages to lots 22, 23, 10th Con., Grantham, by overflowing them.....	" .....		500 00	
				" .....		900 00	

[illegible]

## 2nd.—Property purchased or sold by the Department, &amp;c.—Continued.

Date.	Vendors.	Purchasers.	Property purchased or sold.	For what purpose used.	Area of Land.	Price of Sale.	Remarks.
March 3, 1876	Her Majesty.....	S. F. Matthews.....	Deed of lot 6, between Erin and Brussels Streets, St. John, N.B.....	Not requ'd for Intercol R'y Breakwater.....	50 ft. wide. 3½ acres.	\$ cts. 400 00 250 00	
"	2, 1876 D. G. DesBrisay .. 2, 1876 G. W. Chandler et uz. and Hon. E. B. Chandler .....	Her Majesty .....	" " at Dorchester, N.B. ....	Penitentiary... " " " .....	299 " 170 " 150 "	13,000 00 4,400 00 4,200 00	
Aug. 25, 1876	J. A. Buck et uz.... Corporation of St. John, N.B.....	"	Deed of land for Branch Railway and Breakwater, Courtney Bay, St. John, N.B.....	Intercol R'y Breakwater.....	40 ft. wide. 2½ acres.	50,000 10 100 00	Way (and Ballast Wharf, 180 ft.) and land for Breakwater.
Dec. 14, 1876 June 19, 1874	W. E. Cunningham Municipality, Parish Montreal, and Seminary of St. Sulpice.....	"	Deed of part of lots 2513, 3410, 3409, Côte St. Paul Ward, Lachine Canal .....	Road .....	.....	Free.	Right of way.
Aug. 10, 1876	J. Davidson et uz....	"	Deed of lots on Hector, Frederica, Gore and Water Streets, Fort William.....	Canadian Pac. Railway .....	1½ acres.	6,850 00	
"	14, 1876 H. E. Leys et vir et uz.....	"	Deed of lots on Frederica, Gore, Edward and Chief Streets, Fort William .....	"	5 "	2,025 00	
"	10, 1876 H. Moysey et uz....	"	Deed of land on Frederica St., Fort William .....	"	1 "	450 00	
"	18, 1876 J. L. & A. Baker...	"	Deed of land on Frederica, Edward & Gore Streets, Fort William.....	"	1½ "	608 00	
"	10, 1876 J. L. King.....	"	Gore Street "	"	1½ "	250 00	
"	28, 1876 M. Newton et vir...	"	Water Street "	"	1½ "	300 00	
"	28, 1876 R. Thompson et uz....	"	" "	"	1½ "	300 00	
Oct. 10, 1876	E. E. Horton.....	"	Frederica and Gore Streets, Fort William.....	"	1 "	475 00	
Aug. 10, 1876	A. McNabb et uz....	"	Chief Street, Fort William.....	"	1½ "	225 00	
Nov. 28, 1876	S. Wakella et uz....	"	Water and Hector Streets, Fort William.....	"	1 "	550 00	
Nov. 28, 1876	J. R. Blackwood et vir.....	"	Part of lot 7, 1st Con.	"	1 "	550 00	

Aug.	26, 1876	J. Varnock et ux...	"	.....	"	.....	3 04	"	450 00
"	11, 1876	S. Scarlett.....	"	.....	"	.....	1	"	300 00
"	21, 1876	M. J. Street et vir..	"	.....	"	.....	2	"	900 00
"	14, 1876	J. D. Banks.....	"	.....	"	.....	2 1/2	"	1,300 00
Oct.	2, 1876	John Kay et ux.....	"	.....	"	.....	1	"	250 00
Aug.	24, 1876	J. McLaren et ux....	"	.....	"	.....	5	"	300 00
Sept.	15, 1876	H. Dela Ronde.....	"	.....	"	.....	1	"	4,600 00
Aug.	26, 1876	P. W. Bell et ux.....	"	.....	"	.....	1	"	800 00
"	21, 1876	Alex. Stevenson....	"	.....	"	.....	1	"	275 00
"	21, 1876	John McLeod.....	"	.....	"	.....	1	"	700 00
"	23, 1876	Kate McKellar.....	"	.....	"	.....	1	"	340 00
"	22, 1876	J. W. Plummer et ux	"	.....	"	.....	1	"	250 00
"	21, 1876	Geo. Munro et ux....	"	.....	"	.....	1	"	275 00
"	21, 1876	M. Street et ux.....	"	.....	"	.....	1	"	637 00
Oct.	4, 1876	Geo. Murphy et ux...	"	.....	"	.....	1 1/2	"	900 00
Aug.	11, 1876	do	"	.....	"	.....	1	"	100 00
"	22, 1876	S. Haslewood et ux	"	.....	"	.....	1	"	100 00
"	21, 1876	N. K. Street & M. Street et ux.....	"	.....	"	.....	2 1/2	"	1,375 00
"	25, 1876	J. McIntyre et ux...	"	.....	"	.....	6	"	3,000 00
"	21, 1876	Geo. Faulkner.....	"	.....	"	.....	3	"	2,000 00
"	21, 1876	Chas. Baker et ux...	"	.....	"	.....	1	"	100 00
Aug.	8, 1876	J. J. Vickers et ux...	"	.....	"	.....	3	"	300 00
Nov.	28, 1876	do	"	.....	"	.....	8 02	"	1,200 00
"	7, 1876	Jas. Pearson.....	"	.....	"	.....	1	"	400 00
"	17, 1876	A. C. Thomson et ux	"	.....	"	.....	1	"	275 00
Aug.	14, 1876	J. Davidson et ux and J. Leys et ux	"	.....	"	.....	1 1/2	"	750 00
"	22, 1876	T. & G. Marks et ux	"	.....	"	.....	{ 6 acres.	}	3,550 00
"	22, 1876	T. Marks et ux.....	"	.....	"	.....	{ 4 a. 6 per.	}	1,280 00
"	10, 1876	J. A. Musgrove et ux	"	.....	"	.....	0-10 acres.		80 00
Sept.	21, 1876	J. Taylor et ux.....	"	.....	"	.....	0-35 perches.		225 00
Nov.	13, 1876	Needing Hotel Co.	"	.....	"	.....	1 1/2 acres.		675 00
Aug.	31, 1876	J. Parks et ux.....	"	.....	"	.....	1	"	5,029 38
			"	.....	"	.....	14 1/2 perches.		60 00



## 2nd.—Property purchased or sold by the Department, &amp;c.—Continued.

Date.	Vendors.	Purchasers.	Property purchased or sold.	For what purpose used.	Area of Land.	Price or Sale.	Remarks.
Oct. 19, 1876	J. Davidson et ux.	Her Majesty.....	Deed of lots in Blocks S, T, U, V, and Neebing.....	Can. Pac. R'y.	7½ acres.	\$ 5,485 62	Right of way. Corrected by deed of 19th Oct., 1878.
Aug. 10, 1876	do	"	"	"	1½ acres.	600 00	
" 10, 1876	O. Davidson et ux.	"	Frederica St., Fort William	"	1½ "	725 00	
" 10, 1876	M. J. Brown et ux.	"	Gore Street "	"	2 "	1,000 00	
" 14, 1876	Thos. Wells et ux.	"	"	"	4.40 "	39 60	
March 1, 1877	W. Chaplain et ux.	"	Part 7, 4th Con., Paipoonge	"	4.42 "	44 20	
Feb. 27, 1877	J. S. Finch	"	Part 24, 3rd Con., Neebing.	"	33 feet.	10 00	
April 21, 1877	J. Parke et ux.	"	Frederica St., Fort William	"			
" 21, 1877	R. R. Smith & L. Baker	"	"	"			
March 20, 1877	R. Pather et ux.	"	Part 36, 37, Con. B., Dawson Road Survey.	"	9.99 acres.	79 92	
Jan. 31, 1877	A. M. Clark.	"	Part 19, 20, 2nd Con., Neebing	"	7.11 "	71 10	
Feb. 21, 1877	D. Cameron et ux.	"	Part 11, 12, 13, 2nd Con. "	"	12.14 "	222 35	
March 13, 1877	D. R. McDonald	"	Frederica St., Fort William	"	"	100 00	
Feb. 16, 1877	N. Ramsey et ux.	"	Water Street "	"	"	427 66	
" 19, 1877	J. W. Driscoll et ux.	"	Frederica St., Fort William	"	1½ perches.	100 00	
" 22, 1877	J. G. Murray	"	"	"	"	100 00	
" 28, 1877	R. Thompson et ux.	"	Part K. 87, (Mining lot) District of Thunder Bay.	"	14.97 acres.	119 76	
" 19, 1877	J. M. Hamilton et ux.	"	Part 22, 23, 3rd Con., Neebing.	"	8.83 "	83 30	
" 26, 1876	J. Davidson et ux.	"	Part 4, 5, 3rd Con., Paipoonge.	"	8.52 "	76 78	
" 27, 1877	Wm. Thomas	"	Part 11, 12, 13, 4th Con., Paipoonge.	"	11.31 "	101 70	
" 28, 1877	J. Leys et ux.	"	Part 6, 9, 10, 4th Con., Paipoonge.	"	11.17 "	100 53	
" 2, 1877	A. McGregor	"	Part 1, 2nd Con., and 6, 3rd Con., Paipoonge.	"	5.28 "	41 88	
" 7, 1877	H. O'Brien et ux.	"	Gore Street, Fort William.	"	4.29 "	300 00	
Jan. 26, 1877	J. S. McMurray et ux.	"	Part 25, 3rd Con., Neebing.	"	4.16 "	42 90	
June 11, 1877	J. J. Vickers et ux.	"	Part 18, 2nd Con. "	"	4.16 "	41 60	
			14, 15, 16, 17, 2nd Con., and 20, 21, 3rd Con., Neebing.	"	23.30 "	233 00	

	7, 1877	Dominion Gov't....	Ontario Gov't....	Provisional agreement for sale of Rockwood Asylum, Kingston.....	Lunatic Asy'm		96,500 00
May	2, 1877	Jas. Hunter .....	Her Majesty .....	Release damages to part of lot 22, 15th Con., Storrington, by Hart's Lake Dam	Rideau Canal.....	70 00	
July	26, 1876	J. McElhinney .....	" .....	Release damages to part lot 13, 7th Con., N. Kimsley, by Poonamalie Dam.....	" .....	1,200 00	
"	6, 1876	A. Snyder et al.....	" .....	" .....	" .....	1 00	
April	3, 1876	J. Merrick and A. R. Ward .....	" .....	Order in Council reserving land and water at Merrickville, lots 8, 9, Con. A., Wolford .....	" .....	2 acres.	
"	16, 1875	John King et al.....	" .....	Release damages to part of lots 17, 18, 6th Con., N. Elmsley, by Poonamalie Dam	" .....	5 "	50 00
"	12, 1875	D. Campbell et al.....	" .....	Release damages to S.E. half lot 21, 6th Con., N. Elmsley, by Poonamalie Dam.	" .....	3 "	45 00
"	17, 1875	Jas. Beveridge.....	" .....	Release damages to part of lots 17, 18, 6th Con., N. Elmsley, by Poonamalie Dam.	" .....	10 1/2 "	40 00
May	1, 1877	Her Majesty .....	Port Dover and Lake Huron Railway Co., Marine and Fisheries Dept'., Harbor Commissioners Mont'.	Deed to them of the Port Dover Harbor at month of Patterson's Creek.....	Harbor.....	6,200 00	
April	22, 1876	" .....	" .....	Order in Council transferring Goderich Harbor to Dep't. of Marine and Fisheries..	" .....		
July	23, 1877	" .....	" .....	Discharge of balance of price of lot No. 1, Common Street, Montreal, sold to them 3rd Feb., 1878.....	" .....		
							Principal. 10,987 80
							Interest 1,493 97

*3rd.—Public Property declared to be no longer under the control of this Department, or transferred, during the Fiscal Year ended 30th June, 1877.*

Date of Order in Council.	Published in the <i>Canada Gazette</i> .		Property.	To whom transferred or abandoned.	Remarks.
	Page.	Year.			
Jan. 6, 1877...	920	1877	The Asylums at Toronto and Orillia, the Reformatory at Penetanguishene, and the Jail and Court House at Sault Ste. Marie .....	Government of Ontario.....	Transferred.
Jan. 19, 1877...	917	1877	NOTE.—The S.W. quarter of section 11, township 13, in 2nd range, east of the principal meridian of 160 acres; and legal sub-division 1 and S. half 8, same section, of 60 acres; and 15 and 16 in section 2, said township, of 80 acres, are declared to be Dominion property for a Penitentiary in Province of Manitoba.....	Dominion Government.....	Act 38, Vic, c. 44, (1875).
			NOTE.—On the 12th May, 1876, by an instrument under the hand of the Minister of Public Works, the tolls proposed to be levied by the Mississippi River Improvement Co., for timber running down through their works were reduced.		

H. A. FISSIAULT.

OTTAWA, 30th October, 1877.

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APPENDIX No. 18.

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STATEMENT

Of Claims referred to and arbitrated upon by the Official Arbitrators  
during the Fiscal Year ended 30th June, 1877.

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[1877]

STATEMENT of Claims referred to and arbitrated upon by the Official Arbitrators during the Fiscal Year ended 30th June, 1877.

Claimant.	Subject of Claim.	Date of reference to Arbitration.	Amount claimed. \$ cts.	Amount awarded.	Date of Award.	Remarks.
James S. Evans.....	Land taken for Lachine Canal Enlargement.....	May 23, 1876..		\$ cts.		Claimant fails to appear when called.
Charles Esplan.....	do do .....	do .....	5,486 32	2,234 00	July 15, 1876..	
Theophile Gariépy.....	do do .....	do .....	24,410 00	7,444 00	do .....	
Edward Wilgress.....	do do .....	do .....	16,210 00	3,362 00	do .....	
Representatives of the late Mrs. Wm. Brophy.....	Land taken by Dep't. of Marine and Fisheries for a Lighthouse at Wolfe Island, Lake Ontario.....	May 26, 1876..	650 00	400 00	Dec. 7, 1876..	Notice of appeal given by the Claimant.
J. Bte. Pouliot.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 1.....	June 8, 1876..	500 00			
J. B. A. Chamberland.....	do do .....	do .....	150 00			
Désiré Nadeau.....	do do .....	do .....	155 00	33 00	Jan. 22, 1877..	
Alexis Nadeau.....	do do .....	do .....	185 00	33 00	do .....	
Michel Lagasé.....	do do .....	do .....	300 00	40 00	do .....	
Aristobule Gagnon.....	do do .....	do .....	10 00		do .....	Claimant fails to appear when called.
Jean Bérubé.....	do do .....	do .....	1,536 66	160 00	do .....	
J. Bte. Pelletier.....	do do .....	do .....	60 00	10 00	do .....	
Joseph Chassé.....	do do .....	do .....	1,095 00	140 00	do .....	
Louis Bérubé.....	do do .....	do .....	1,040 00	60 00	do .....	
Widow Max. Chassé.....	do do .....	do .....	2,166 67	110 00	do .....	
Jacques Poonée.....	do do .....	do .....	1,653 33	65 00	do .....	
Felix Gagnon.....	do do .....	do .....	2,166 66	Nil.	do .....	
François Bérubé.....	do do .....	do .....	1,570 00	Nil.	do .....	
Paul Bélanger.....	do do .....	do .....	160 00	Nil.	do .....	
Georges Desjardins.....	do do .....	do .....	215 00	10 00	do .....	
Joseph Gagnon, Cacouna.....	do do .....	do .....	100 00	45 00	do .....	
François Vaillancourt.....	do do .....	do .....	200 00	50 00	do .....	
Urban Dumont.....	do do .....	do .....	300 00	50 00	do .....	
Pierre Martin.....	do do .....	do .....	2,416 66	100 00	do .....	
Georges Saindon.....	do do .....	do .....	2,303 33	Nil.	do .....	

Felix Salindon.....	do	20 00	Nil.	do	Claimant fails to appear when called.
Pierre Dumont.....	do	226 67	Nil.	do	
Isaac Gagnon.....	do	541 68	80 00	do	
J. Bte. Côté.....	do	110 00	60 00	do	
J. Bte. Dumont.....	do	151 88	60 00	do	
Edouard Côté.....	do	100 00	60 00	do	
Pierre Salindon and heirs.....	do	120 00	.....	do	
Marcel LeBel.....	do	70 00	40 00	do	
Henri Brillant.....	do	40 00	25 00	do	
Pierre Brillant.....	do	30 00	25 00	do	
J. Bte. Pelletier.....	do	100 00	60 00	do	
Widow N. Garon.....	do	250 00	60 00	do	
Basile Côté.....	do	60 00	25 00	do	
Joseph Dédé Gagnon.....	do	115 00	50 00	do	
Adolphe Dionne.....	do	230 00	Nil.	do	This claim is for damage by a railway snow fence, and Arbitrators treat such cases by special report.
Xavier Dufour.....	do	310 00	Nil.	do	
Joseph Gagnon, St. Arsène.....	do	300 00	.....	do	
Georges Dionne.....	do	100 00	25 00	do	
Hippolyte Lapointe.....	do	216 68	Nil.	do	Claimant fails to appear when called.
Elie Mailhoux.....	do	150 00	.....	do	do
Adolphe Dufour.....	do	50 00	Nil.	do	
Norbert Demeul.....	do	750 00	Nil.	do	
Cyprien Soucy.....	do	80 00	Nil.	do	
Joseph Malenfant.....	do	750 00	100 00	do	
Marcel Garneau.....	do	400 00	60 00	do	
Damase Lucas.....	do	600 00	50 00	do	
Charles Pelletier.....	do	450 00	25 00	do	
Charles Bertrand.....	do	800 00	.....	do	Claimant appears when called and withdraws claim.
J. Bte. Marquis.....	do	500 00	100 00	Jan. 22, 1877..	do
Guillaume Simard.....	do	300 00	.....	.....	do
Joseph Chenard.....	do	300 00	65 00	Jan. 22, 1877..	do
Marcel Talbot.....	do	150 00	Nil.	do	do
Joseph Caron.....	do	150 00	.....	do	do
Théophile Levasseur.....	do	300 00	.....	do	Claimant fails to appear when called.
Joseph St. Pierre.....	do	200 00	50 00	Jan. 22, 1877..	
Jude Ouellette.....	do	400 00	165 00	do	
Frs. Ouellette.....	do	150 00	50 00	do	
Hilaire Dubé.....	do	300 00	100 00	do	
Joseph Paré.....	do	200 00	60 00	do	
Amable Ouellette.....	do	200 00	Nil.	do	
David Dumont.....	do	100 00	35 00	do	
Joseph Rouleau son.....	do	120 00	63 00	do	

## APPENDIX No. 18.—Statement of claims referred to and arbitrated upon by the Official Arbitrators, &amp;c.—Continued.

Claimant.	Subject of Claim.	Date of reference to Arbitration.	Amount claimed.	Amount awarded.	Date of Award.	Remarks.
Widow N. Bertrand .....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 1. ....	June 8th, 1876	\$ 400 00	\$ cts. Nil.	Jan. 22, 1877.	
L. A. Bertrand .....	do do .....	do	400 00	20 00	do	
Jean Labrie .....	do do .....	do	933 33	25 00	do	
Hubert Delisle .....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 2. ....	do	32 00			Claimant fails to appear when called.
Cyrille Leclerc .....	do do .....	do	50 00			do
Ignace Rioux .....	do do .....	do	160 00		Jan. 22, 1877.	
Widow George Drapeau .....	do do .....	do	250 00	50 00	do	
Hypolite LeBel .....	do do .....	do	100 00			do
Emile LeBel .....	do do .....	do	740 00	333 00	Jan. 22, 1877.	
Anselme Métayer .....	do do .....	do	880 00	360 00	do	
J. Bte. Métayer .....	do do .....	do	880 00	363 00	do	
Anselme Rioux .....	do do .....	do	53 00	Nil.	do	
Eugène Godbout .....	do do .....	do	300 00			do
Eugène LeBlond .....	do do .....	do	60 00			{ These three claims are for damages by a railway snow fence, and arbitrators treat such cases by special report.
Paul Gagnon .....	do do .....	do	40 00			
Pascal Beaulieu (Haddon) .....	do do .....	do	30 00			
Joseph LeBlond .....	do do .....	do	110 00	25 00	Jan. 22, 1877.	
Ulgère Dion .....	do do .....	do	50 00	Nil.	do	
Solomon Dion .....	do do .....	do	80 00	Nil.	do	
J. Bte. LeBlond .....	do do .....	do	18 00	18 00	do	
Théophile Bélanger .....	do do .....	do	60 00			Claimant fails to appear when called.
Joseph Rioux .....	do do .....	do	844 95	326 00	Jan. 22, 1877.	
J. Bte. Soucy .....	do do .....	do	100 00			Claimant appears when called
Julien Rioux .....	do do .....	do	100 00			and withdraws claim.
Ruben Rioux and } .....	do do .....	do	5,083 34			do
Théophile Rioux } .....	do do .....	do	200 00	351 00	Jan. 22, 1877.	

[illegible]



## APPENDIX No. 18.—Statement of Claims referred to and arbitrated upon by the Official Arbitrators, &amp;c.—Continued.

Claimant.	Subject of Claim.	Date of reference to Arbitration.	Amount claimed.	Amount awarded.	Date of Award.	Remarks.
Stanislas Bélanger .....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 2.....	June 8, 1876..	\$ cts. 100 00	\$ cts. 25 00	Jan. 22, 1877..	Claimant fails to appear when called. do
Jean Bélanger .....	do	do	75 00	Nil.	Jan. 22, 1877..	Claimant appears when called and withdraws claim.
Louis Gauvin.. ..	do	do	289 24	Nil.	do	do
Eusébe Pelletier .....	do	do	75 00	Not stated.	do	do
Abraham Théberge .....	do	do	Not stated.	Nil.	Jan. 22, 1877..	do
Noël Gagnon.....	do	do	100 00	Nil.	Jan. 22, 1877..	do
Joseph Coulombe, sen.....	do	do	26 00	Nil.	Jan. 22, 1877..	do
Théophile Théberge.....	do	do	56 00	Nil.	Jan. 22, 1877..	do
Cyrille Bélanger.....	do	do	Not stated.	25 00	do	Award postponed.
Samuel Caron .....	do	do	do	do	do	Claimant appears when called and withdraws claim.
Joseph Coulombe, jun.....	do	do	do	do	do	do
Irènes Bélanger.....	do	do	do	do	do	do
Chrysologue Thibault.....	do	do	do	do	do	do
Narcisse Lemieux.....	do	do	do	do	do	do
Veuve Eszéchas Levesque.....	do	do	do	do	do	do
Antoine Bélanger.....	do	do	do	do	do	do
Philippe Théberge.....	do	do	do	do	do	do
Wilfrid Gauvin.....	do	do	do	do	do	do
Georges Gauvin .....	do	do	50 00	Nil.	Jan. 22, 1877..	do
J. Be. Bélanger .....	do	do	800 00	do	do	do
Théophile Bélanger.....	do	do	30 00	do	do	do
Marcel Théberge.....	do	do	do	do	do	do
Joseph Caron.....	do	do	do	do	do	do
Widow Pierre Garant.....	do	do	do	do	do	do
Jacques Bélanger.....	do	do	do	do	do	do
Abraham Ouellette.....	do	do	do	do	do	do
David Ouellette.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 5 .....	do	Not stated.	Nil.	Jan. 22, 1877..	Claimant fails to appear when called.
		do	Not stated	12 00	Jan. 22, 1877..	

NAME	AMOUNT	DATE	REMARKS
Olivier Gagnon.....	350 00	25 00	do
Joseph Bélanger.....	52 00	.....	do
Epiphane Bélanger.....	25 00	.....	do
Valières Bélanger.....	12 00	.....	do
Joseph Fournier.....	20 00	.....	do
Epiphane Bélanger.....	20 00	.....	do
Eduard Gagnon.....	55 00	.....	do
Pierre Morais.....	12 00	.....	do
John Degtise.....	20 00	.....	do
Bruno Fortin.....	15 00	.....	do
Cyril Dastou.....	100 00	.....	do
Théodule Levesque.....	20 00	.....	do
Octave Thibault.....	60 00	.....	do
Bruno Lizotte.....	100 00	.....	do
Hilaire Fournier.....	40 00	.....	do
Pierre Coulombe.....	1,333 33	50 00	do
Romain Bérubé.....	90 00	Jan. 22, 1877..	do
Joseph Bélanger.....	50 00	Jan. 22, 1877..	do
Pierre Coulombe.....	40 00	.....	do
Widow Cha. Bélanger.....	40 00	.....	do
Fabien Bélanger.....	275 00	25 00	do
Napoleon Gaudreau.....	615 00	.....	do
Octave Morin.....	380 00	.....	do
Zéphirin Albert.....	252 00	37 00	do
Charles Coulombe.....	185 00	.....	do
Joseph Desjardins.....	52 00	15 00	do
Noël Fortin.....	280 00	50 00	do
Louis Fortin.....	100 00	10 00	do
Octave Bérubé.....	11 00	.....	do
do.....	10 00	.....	do
Elie Gagnon.....	200 00	20 00	do
Louis Gagnon.....	40 00	.....	do
do.....	5 00	.....	do
Georges Gagnon.....	10 70	.....	do
Elie Gagnon.....	1,378 83	215 00	do
Nicholas Leeras.....	32 00	Nil.	do
Zéphirin Dastous.....	330 00	.....	do
Achille Côté.....	.....	.....	do

## APPENDIX No 18.—Statement of Claims referred to and arbitrated upon by the Official Arbitrators, &amp;c —Continued.

Claimant.	Subject of Claim.	Date of reference to Arbitration.	Amount claimed.	Amount awarded.	Date of Award.	Remarks.
Joseph Lóvesque .....	Damages, &c., to properly resulting from construction of Intercolonial Railway, Section No. 5 .....	June 8, 1876 ..	\$ cts. Not stated.	\$ cts. ....	.....	Claimant fails to appear when called.
Firmin Guerrette .....	do do .....	do ..	325 00	.....	.....	do
André Côté .....	do do .....	do ..	350 00	.....	.....	Claimant appears when called and withdraws claim.
Félix Guerrette .....	do do .....	do ..	50 00	.....	.....	Claimant fails to appear when called.
Chas. Gagnon .....	do do .....	do ..	636 00	Nil.	Jan. 22, 1877.	do
Widow Magloire Gagné .....	do do .....	do ..	100 00	Nil.	do ..	do
Antoine Roy .....	do do .....	do ..	150 00	.....	.....	Claimant appears when called and withdraws claim.
Laurent Derostiers .....	do do .....	do ..	110 00	50 00	Jan. 22, 1877.	do
Ambroise Voyer .....	do do .....	do ..	280 00	.....	.....	Claimant appears and refuses to give bond for costs.
Stanislas Brillant .....	do do .....	do ..	100 00	.....	.....	Claimant appears when called and withdraws claim.
Ferdinand Bernard .....	do do .....	do ..	Not stated.	.....	.....	Claimant fails to appear when called.
J. B. Lafrance .....	do do .....	do ..	25 00	.....	.....	do
Théophile Couture .....	do do .....	do ..	340 00	30 00	Jan. 22, 1877.	do
Joseph Bernier or Joseph Lamarre .....	do do .....	do ..	430 00	Nil.	do ..	do
Joseph Bérubé .....	do do .....	do ..	.....	.....	.....	Claimant appears and refuses to give bond for costs.
André Morin .....	do do .....	do ..	150 00	.....	.....	Claimant fails to appear when called.
Joseph Rioux .....	do do .....	do ..	50 00	.....	.....	do
Widow Chas. Longchamps ..	do do .....	do ..	140 00	20 00	Jan. 22, 1877.	do
Hector Geo. Bérubé .....	do do .....	do ..	80 00	20 00	do ..	do
Antoine Charest .....	do do .....	do ..	100 00	20 00	do ..	do
Octave Rioux .....	do do .....	do ..	375 00	.....	.....	do
Julie Gagné .....	do do .....	do ..	450 00	.....	.....	do
Majorique Rioux .....	do do .....	do ..	.....	.....	.....	Claimant appears when called and withdraws claim.

Widow D. Talbot.....	do	do	150 00	12 00	Jan. 22, 1877..	Claimant fails to appear when called.
L. E. Gauvreau.....	do	do	100 00	.....	.....	.....
Arthur Chamberland.....	do	do	125 00	65 00	Jan. 22, 1877..	Claimant appears when called and withdraws claim.
Fabrique of Bic.....	do	do	200 00	.....	.....	Claimant fails to appear when called.
CoFortunat Côté.....	do	do	25 00	.....	.....	do
Georges Sylvain.....	do	do	100 00	100 00	Jan. 22, 1877..	do
Pierre Santerre.....	do	do	400 00	25 00	do	do
Charles Lavoie.....	do	do	325 00	.....	.....	do
François Beaulieu.....	do	do	275 00	.....	.....	do
Isaac Campbell.....	do	do	80 00	.....	.....	do
Edouard Voyer.....	do	do	100 00	.....	.....	do
Alfred Ouellette.....	do	do	100 00	.....	.....	do
Pierre Ouellette.....	do	do	500 00	125 00	Jan. 22, 1877..	Claimant appears when called and withdraws claim.
Wm. Chamberland.....	do	do	125 00	.....	.....	Claimant appears and refuses to give bond for costs.
Nazaire Ouellette.....	do	do	220 00	.....	.....	Claimant appears when called and withdraws claim.
Georges Lavoie.....	do	do	100 00	.....	.....	Claimant fails to appear when called.
W. D. Campbell.....	do	do	164 00	.....	.....	do
Henri Plourde.....	do	do	74 00	.....	.....	do
André Ouellette.....	do	do	50 00	.....	.....	do
Louis Lavoie.....	do	do	250 00	10 00	Jan. 22, 1877..	do
Martial Labrie.....	do	do	150 00	12 00	do	do
François Parent.....	do	do	495 00	Nil.	do	do
Octave Brillant.....	do	do	330 00	50 00	do	do
Joseph Pineau.....	do	do	100 00	.....	.....	do
Alex. Desjardins.....	do	do	200 00	Nil.	Jan. 22, 1877..	do
Jean Gagnon.....	do	do	40 00	.....	.....	do
Henri Gagnon.....	do	do	1,100 00	Nil.	Jan. 22, 1877..	do
Pierre Gagnon.....	do	do	100 00	.....	.....	do
Jerome Turcotte.....	do	do	1,165 00	100 00	Jan. 22, 1877..	do
Joseph Dubé.....	do	do	50 00	15 00	do	do
Timothée Pineau.....	do	do	688 67	.....	.....	Claimant appears when called and withdraws claim.
Gasimir Pineau.....	do	do	400 00	.....	.....	Claimant fails to appear when called.
Eustache Roy.....	do	do	.....	.....	.....	.....
Widow A. Bradley.....	do	do	575 00	Nil.	Jan. 22, 1877..	Claimant appears when called and withdraws claim.
Alex. Fraser.....	do	do	200 00	.....	.....	.....
Norbert Roussel.....	do	do	.....	.....	.....	.....
Pierre Lavoie.....	do	do	150 00	10 00	Jan. 22, 1877..	.....
Ferdinand Tremblay.....	do	do	128 00	10 00	do	.....

## APPENDIX No. 18.—Statement of Claims referred to and arbitrated upon by the Official Arbitrators, &amp;c.—Continued.

Claimant.	Subject of Claim.	Date of reference to Arbitration.	Amount claimed, \$ cts.	Amount awarded.	Date of Award.	Remarks.
Elzéar Lavoie.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 5.....	June 9, 1876.	380 00	\$ cts.		Claimant fails to appear when called.
Felix Lévesque .....	do do .....	do	32 00			Claimant appears when called and withdraws claim.
Widow P. Langis .....	do do .....	do	367 00	Nil.	Jan. 22, 1877.	do
Joanem Dubé .....	do do .....	do	100 00	Nil.	do	do
Jean Langis, fils de Louis .....	do do .....	do	93 60			Claimant fails to appear when called.
Elzéar Drapeau.....	do do .....	do	10 00			Claimant appears when called and withdraws claim.
Jean Langis, fils de Germain.	do do .....	do	200 00	Nil.	Jan. 22, 1877.	do
Aguste Langis.....	do do .....	do	142 80	Nil.	do	do
François Castonguay .....	do do .....	do				do
Etienne Patris.....	do do .....	do	200 00	Nil.	Jan. 22, 1877.	do
Angèle Caron.....	do do .....	do	1,250 00	25 00	do	do
Joseph Parent.....	do do .....	do	120 00	50 00	do	do
Elzéar Pinault.....	do do .....	do	650 00	54 00	do	do
Paschal Parent.....	do do .....	do	1,100 00	50 00	do	do
Aguste Parent.....	do do .....	do	426 00	50 00	do	do
Louis Onellette.....	do do .....	do				Claimant fails to appear when called.
Louis Lavoie.....	do do .....	do	5,850 00	Nil.	Jan. 22, 1877.	do
The Seminary of Rimouski.....	do do .....	do	560 00	104 00	do	do
The Bishop of Rimouski.....	do do .....	do	840 00	161 00	do	do
Eusèbe LePage.....	do do .....	do	3,398 00	Nil.	do	do
Mrs. P. L. Gauvreau.....	do do .....	do	200 00	50 00	do	do
Joseph Garon.....	do do .....	do	150 00			do
Joseph St. Laurent .....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 5.....	do	152 00	77 00	Jan. 22, 1877.	Claimant appears when called and withdraws claim.
Lezare St. Laurent.....	do do .....	do	345 00	207 00	do	do
P. A. Pouliot.....	do do .....	do	720 00	366 00	do	do
	do do .....	do	735 00	156 25	do	do

Pierre Gagné.....	do	do	do	150 AC	do	do	do
Joseph Gagné.....	do	do	do	148 CO	do	do	do
David Chouinard.....	do	do	do	Nil.	Jan. 22, 1877..	do	do
Edouard Headland.....	do	do	do	Nil.	do	do	do
L. A. Poullet.....	do	do	do	336 CO	do	do	do
Pierre Pincen.....	do	do	do	50 CO	do	do	do
départ de Banville.....	do	do	do	150 CO	do	do	do
J. Bte. de Banville.....	do	do	do	300 CO	do	do	do
Paul Côté.....	do	do	do	200 CO	do	do	do
Amable St. Laurent.....	do	do	do	200 CO	do	do	do
Théophile Rioux.....	do	do	do	690 CO	Jan. 22, 1877..	do	do
Jean St. Laurent.....	do	do	do	160 CO	do	do	do
Municipality of St. Anaclet.....	do	do	do	33 CO	do	do	do
Germain Lemieux.....	do	do	do	200 CO	do	do	do
J. E. Grondin.....	do	do	do	160 CO	Jan. 22, 1877..	do	do
Pierre Poirier.....	do	do	do	10 CO	do	do	do
Ignace Poirier.....	do	do	do	550 CO	Jan. 22, 1877..	do	do
Laurent Poirier.....	do	do	do	25 CO	do	do	do
Achille Gagné.....	do	do	do	54 CO	do	do	do
Jean Pierre St. Laurent.....	do	do	do	2,050 CO	Jan. 22, 1877..	do	do
Geo. Stephen.....	do	do	do	1,000 CO	do	do	do
Fra. Jos. Pouliot.....	do	do	do	2,000 CO	do	do	do
J. N. Pouliot.....	do	do	do	1,500 CO	do	do	do
Victor Bouillon.....	do	do	do	1,000 CO	do	do	do
Wm. Lavoie.....	do	do	do	2,090 CO	do	do	do
Melchior St. Laurent.....	do	do	do	25 CO	do	do	do
Pierre Roy.....	do	do	do	14 CO	do	do	do
Olivier Ruest.....	do	do	do	160 CO	Jan. 23, 1877..	do	do
Jean Heppel.....	do	do	do	65 CO	do	do	do
Sylvain Lavoie.....	do	do	do	500 CO	do	do	do
Pierre Heppel.....	do	do	do	50 CO	do	do	do
Laurent Poirier.....	do	do	do	100 CO	do	do	do
Joseph Heppel.....	do	do	do	do	do	do	do
Benoni Gagnon.....	do	do	do	29 CO	Jan. 22, 1877..	do	do
Joseph Ross.....	do	do	do	110 CO	do	do	do
Julien Lévesque.....	do	do	do	25 CO	do	do	do
Napoléon Lavoie.....	do	do	do	25 CO	do	do	do
Germain Lavoie.....	do	do	do	333 CO	Jan. 22, 1877..	do	do
Antoine Proulx.....	do	do	do	40 CO	do	do	do
Joseph Langlois.....	do	do	do	do	do	do	do
Jean Chasseur.....	do	do	do	100 CO	Jan. 23, 1877..	do	do
James and Daniel Banville.....	do	do	do	Nil.	do	do	do
J. Bte. Caron.....	do	do	do	450 CO	do	do	do

## APPENDIX No. 18.—Statement of Claims referred to and arbitrated upon by the Official Arbitrators, &amp;c.—Continued.

Claimant.	Subject of Claim.	Date of reference to Arbitration.	Amount claimed.	Amount awarded.	Date of Award.	Remarks.
Léon Roy.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 8.....	June 8, 1876..	\$ cts. 100 00	\$ cts. .....	.....	Claimant appears when called and withdraws claim.
Joseph Lavoie.....	do do	do	200 00	25 00	Jan. 22, 1877..	Claimant fails to appear when called.
L. N. Gagné.....	do do	do	85 06	.....	.....	.....
Prudent Ouellette.....	do do	do	2,504 98	Nil.	Jan. 22, 1877..	.....
Louis Parent.....	do do	do	Not stated.	Nil.	do	.....
Fra. Rosaire Pineau.....	do do	do	Not stated.	20 00	do	.....
Théophile Mongrain.....	do do	do	120 00	40 00	do	.....
Joseph Tanguay.....	do do	do	.....	.....	.....	Claimant appears when called and withdraws claim.
Gobert Tremblay.....	do do	do	120 00	40 00	Jan. 22, 1877..	.....
Manert Gagnon.....	do do	do	250 00	40 00	do	.....
Célestin Oôté.....	do do	do	150 00	40 00	do	.....
Michel Charette.....	do do	do	200 00	40 00	do	.....
Paul Langevin.....	do do	do	300 00	40 00	do	.....
Jean Morrisette.....	do do	do	50 00	Nil.	do	.....
Fabien Drapeau.....	do do	do	300 00	40 00	do	.....
Laurent Lavoie.....	do do	do	200 00	25 00	do	.....
Fra. Xavier Gagné.....	do do	do	400 00	40 00	do	.....
Treffé Mongrain.....	do do	do	100 00	.....	.....	Claimant fails to appear when called.
Sylvestre de Champlain.....	do do	do	100 00	40 00	Jan. 22, 1877..	.....
Pierre de Champlain.....	do do	do	Not stated.	40 00	do	.....
Florence de Champlain.....	do do	do	300 00	20 00	do	.....
André de Champlain.....	do do	do	43 75	43 75	do	.....
Alexis Desrosiers.....	do do	do	600 00	100 00	do	.....
Joseph Faucher.....	do do	do	1,000 00	50 00	do	.....
Hubert Langlois.....	do do	do	Not stated.	50 00	do	.....
Simeon Lavoie.....	do do	do	100 00	.....	.....	Claimant appears when called and withdraws claim.
Abel Desrosiers.....	do do	do	650 00	30 00	Jan. 22, 1877..	.....
.....	do do	do	300 00	20 00	do	.....

Defendant's Name	Plaintiff's Name	Amount	Case No.	Verdict	Remarks
George Pelletier	do	Not stated.	1000	do	Claimant fails to appear when called.
Napoléon St. Laurent	do	520 00	1001	do	Ruled out; claimant having died since reference to arbitration.
Victor Langlois	do	1,100 00	1002	do	
Paul Desrosiers	do	1,157 33	1003	do	
Gobert Girard	do	992 00	1004	do	
Ferdinand Roy	do	698 00	1005	do	
Louis de Champlain	do	778 00	1006	do	
François Dubé	do	657 00	1007	do	
Jean Auchut	do	Not stated.	1008	do	
Ferdinand Langis	do	228 00	1009	do	
F. X. Charette	do	Nil.	1010	do	
J. J. Bte. Bariault	do	Nil.	1011	do	
Marcel Gaudreau	do	635 00	1012	do	Claimant fails to appear when called.
François Bouchard	do	Not stated.	1013	do	Claimant appears when called and withdraws claim.
Ferdinand Roy	do	686 00	1014	do	Ruled out by the Arbitrators.
Xavier Drapeau	do	Not stated.	1015	do	
Joseph Charette	do	287 00	1016	do	
J. J. Bte. Charette	do	30 00	1017	do	Claimant fails to appear when called.
Michel Larrivée	do	460 00	1018	do	
Chs. Larrivée	do	272 00	1019	do	
Elzéar Deschênes	do	320 00	1020	do	
Edouard Olutier	do	375 00	1021	do	
Edouard Smith	do	25 00	1022	do	
Pierre Gagné	do	70 00	1023	do	
Paul Ross	do	450 00	1024	do	
Alexandre Ross	do	178 00	1025	do	
Augustin Ross	do	227 00	1026	do	
Louis Desrosiers	do	1,608 00	1027	do	
Germain Thibault	do	700 00	1028	do	
Joseph Martel	do	200 00	1029	do	
Alex. Lavoie	do	400 00	1030	do	
Frs. X. Pelletier	do	100 00	1031	do	
	do	20 00	1032	do	
	do	150 00	1033	do	



## APPENDIX No. 13.—Statement of Claims referred to and arbitrated upon by the Official Arbitrators, &amp;c.—Continued.

Claimant.	Subject of Claim.	Date of reference to Arbitration.	Amount claimed.	Amount awarded.	Date of Award.	Remarks.
Fra. X. Parent.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 8.....	June 8, 1876.	\$ 300 00	\$ cts.		Claimant fails to appear when called.
Alex. Dntremble.....	do	do	300 00	Nil.	Jan. 22, 1877.	do
Victor Duguay.....	do	do	350 00	Nil.	Jan. 22, 1877.	do
F. N. Blanchet.....	do	do	250 00	Nil.	do	do
J. Ste. Saucier.....	do	do	300 00	Nil.	do	do
Alex. Marquis.....	do	do	800 00	Nil.	do	do
Laurent Thibault.....	do	do	120 00	Nil.	do	do
Edouard St. Onge.....	do	do	155 00	Nil.	do	do
F. X. Bernier.....	do	do	108 00	Nil.	Jan. 22, 1877.	Claimant fails to appear when called.
Edouard Bernier.....	do	do	408 00	Nil.	do	do
Elzéar Ouellette.....	do	do	22 34	Nil.	do	do
Hilaire Roy.....	do	do	142 00	Nil.	do	do
J. Ste. Paradis.....	do	do	100 00	Nil.	do	do
Joseph Dubé.....	do	do	450 00	Nil.	Jan. 22, 1877.	do
François Lavasseur.....	do	do	1,200 00	Nil.	do	do
George Dubé.....	do	do	410 00	Nil.	Jan. 22, 1877.	do
Olivier Caron.....	do	do	420 00	Nil.	do	do
Rémi Dubé.....	do	do	250 00	Nil.	do	do
Solomon Bédanger.....	do	do	Not stated.	Nil.	do	do
Olivier Caron and Solomon Bédanger.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 13.....	do	{ 26 40 8 60 }	{ 26 40 8 60 }	do	do
Jacob Lepage and Paschal Ouellette.....	do	do	{ 303 00 200 00 }	{ 110 50 50 00 }	do	do
Melchior Ouellette.....	do	do	120 00	Nil.	do	do
Olivier Bérubé.....	do	do	200 00	Nil.	do	do
Fra. X. Perreault.....	do	do	200 00	Nil.	do	do
Widow J. St. Laurent.....	do	do	1,300 00	Nil.	Jan. 22, 1877.	do
Jon. Prudent Bidon.....	do	do	1,425 00	Nil.	do	do

André Barabé.....	do	841 00	do	do	do	Claimant appears and refuses to give bond for costs.
Honoré Ouhette, jun.....	do	284 00	do	do	do	Claimant fails to appear when called.
Etienne Fortin, fils de Joseph.....	do	100 00	do	do	do	Claimant appears when called and withdraws claim.
Octave Morin.....	do	163 00	do	do	do	do
do	do	200 00	do	do	do	Claimant fails to appear when called.
Jean Bastille.....	do	80 00	do	do	do	do
F. X. Michaud.....	do	15 00	do	do	do	Claimant appears when called and withdraws claim.
Alex. Smith.....	do	15 00	do	do	do	do
Ferdinand Moreau.....	do	22 50	do	do	do	Claimant fails to appear when called.
Jas. McEwing.....	do	8 00	do	do	do	do
Angus Campbell.....	do	515 00	do	do	do	Claimant appears when called and withdraws claim.
Louis Bérubé.....	do	4 00	do	do	do	do
do	do	30 00	do	do	do	do
Richard Jenkins.....	do	330 00	do	do	do	do
Louis Dubé.....	do	Nil.	do	do	do	do
Joseph Beaulieu.....	do	550 00	do	do	do	do
Joseph Beuchard.....	do	Not stated.	do	do	do	do
Louis Fortin.....	do	160 00	do	do	do	do
Théodore Richard.....	do	400 00	do	do	do	do
Anselme Bastille.....	do	600 00	do	do	do	do
Etienne Fortin, fils de Louis Marie.....	do	52 00	do	do	do	do
François Bastille.....	do	Not stated.	do	do	do	do
Louis Miller.....	do	400 00	do	do	do	do
Joseph Ouellette.....	do	140 00	do	do	do	do
Hector Routhier.....	do	300 00	do	do	do	do
F. X. Turgeon.....	do	73 50	do	do	do	do
Magloire Bérubé.....	do	190 00	do	do	do	do
Aristobule Roy.....	do	Not stated.	do	do	do	do
Octave Gendron.....	do	400 00	do	do	do	do
Bruno Richard.....	do	Not stated.	do	do	do	do
Wm. Saucier.....	do	Not stated.	do	do	do	do
Elséar Bernier.....	do	Not stated.	do	do	do	do

## APPENDIX No. 18.—Statement of Claims referred to and arbitrated upon by the Official Arbitrators, &amp;c.—Continued.

Claimant.	Subject of Claim.	Date of reference to Arbitration.	Amount claimed.	Amount awarded.	Date of Award.	Remarks.
Fredif Thibault.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 13.....	June 8, 1877..	\$ cts. Not stated.	\$ cts.	.....	Claimant appears and withdraws claim.
Daniel Smith.....	do do .....	do ..	24 00	.....	.....	Claimant fails to appear when called.
Octave Blanchet.....	do do .....	do ..	50 00	16 00	Jan. 22, 1877..	Claimant appears and refuses to give bond for costs. do
Germain Ruest.....	do do .....	do ..	100 00	.....	.....	do
Robert Carroll.....	do do .....	do ..	80 00	.....	.....	do
M. Roy .....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 14.....	do ..	1 01	.....	.....	Claimant fails to appear when called.
Pierre Ross .....	do do .....	do ..	50 00	50 00	Jan. 22, 1877..	do
Léon St. Laurent.....	do do .....	do ..	99 00	.....	.....	do
Edouard Brousseau.....	do do .....	do ..	.....	.....	.....	do
Jean Brochu.....	do do .....	do ..	.....	.....	.....	do
Thos. Fréchette.....	do do .....	do ..	Not stated.	10 00	Jan. 22, 1877..	do
Lazare Roy.....	do do .....	do ..	50 00	.....	.....	do
Joseph Poirier.....	do do .....	do ..	Not stated.	100 00	Jan. 22, 1877..	do
Thos. Beaulieu.....	do do .....	do ..	Not stated.	25 00	do ..	do
Jérôme Bernier.....	do do .....	do ..	801 86	9 00	do ..	do
Chrysostôme Bernier.....	do do .....	do ..	189 80	Nil.	do ..	do
Adolphe Otis .....	do do .....	do ..	22 00	.....	.....	do
D. Robitaille.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 17.....	do ..	46 20	.....	.....	do
D. McLeod.....	do do .....	do ..	54 60	.....	.....	do
Isate Ritchot.....	do do .....	do ..	278 96	.....	.....	do
Pierre Desjardins .....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 1.....	Aug. 19, 1876..	130 00	.....	.....	do
Jean Berubé.....	do do .....	do ..	153 33	.....	.....	do
François LeBel .....	do do .....	do ..	478 00	.....	.....	do
Jérémie LeBel .....	do do .....	do ..	430 66	.....	.....	do

J. Candide Dion.....	do	do	50 00						
Wm. Simard.....	do	do	183 33						
Hilaire Dubé.....	do	do	76 00						
Jude Ouellette.....	do	do	333 33						
Alexis Leclerc.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 2.....								
Ulgère Dion.....	do	do	416 66						
Théophile Bélanger.....	do	do	100 00						
Nazaire Tétu.....	do	do	62 00						
Magloire Dubé.....	do	do	333 34			50 00		Jan. 22, 1877..	
Cyrille Gagnon.....	do	do	284 00						
Joseph St. Laurent.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 8.....	do	566 66						
Napoléon Côté.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 17.....	do	200 00			Nil.		Jan. 22, 1877..	
Hilaire Dubé.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 1.....	Sept. 5, 1876.	130 00						
Narcisse Bellefleur.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 2.....	do	60 00						
Widow Théo. Soucy.....	do	do	80 00						
Sifroi Dubé.....	do	do	100 00						
Vital Rioux.....	do	do	100 00						
Joseph Michaud.....	do	do	40 00						
Napoléon Rioux.....	do	do	40 00						
do	do	do	50 00						
Jules Larrivée.....	do	do	181 25						
Hermidas Denis.....	do	do	80 00						
Celestin Bernier.....	do	do	90 00						
Widow P. Garant.....	do	do	Not stated.						
Cyriac Dastous.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 6.....	do	Not stated.						
Magloire Dubé.....	do	do	20 00						
Fabien Ouellet.....	do	do	18 00						
Lucien Bélanger.....	do	do	300 00						
Joseph Heppel.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 8.....	do							
Ignace St. Pierre.....	do	do	390 00			Nil.		Jan. 22, 1877..	
John Smith.....	do	do	Not stated.					do	
Esdras Dechêne.....	do	do	300 00			25 00		do	
Lazare Verreault.....	do	do	35 00						
	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 13.....	do	220 00			Nil.		Jan. 22, 1877..	

## APPENDIX No. 18.—Statement of Claims referred to and arbitrated upon by the Official Arbitrators, &amp;c.—Continued.

Claimant.	Subject of Claim.	Date of reference to Arbitration.	Amount claimed.	Amount awarded.	Date of Award.	Remarks.
Fredif Thibault.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 13.....	June 8, 1877..	\$ cts. Not stated.	\$ cts. .....	.....	Claimant appears and withdraws claim.
Daniel Smith.....	do do .....	do ..	24 00	.....	.....	Claimant fails to appear when called.
Octave Blanchet.....	do do .....	do ..	50 00	.....	Jan. 22, 1877..	Claimant appears and refuses to give bond for costs. do
Germain Ruest.....	do do .....	do ..	100 00	.....	.....	do
Robert Carroll.....	do do .....	do ..	80 00	.....	.....	do
M. Roy .....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 14.....	do ..	1 01	.....	.....	Claimant fails to appear when called.
Pierre Ross.....	do do .....	do ..	50 00	.....	Jan. 22, 1877..	do
Léon St. Laurent.....	do do .....	do ..	99 00	.....	.....	do
Edouard Brousseau.....	do do .....	do ..	.....	.....	.....	do
Jean Brochu.....	do do .....	do ..	.....	.....	.....	do
Thos. Fréchette.....	do do .....	do ..	Not stated.	.....	Jan. 22, 1877..	do
Lazare Roy.....	do do .....	do ..	50 00	.....	.....	do
Joseph Poirier.....	do do .....	do ..	Not stated.	.....	Jan. 22, 1877..	do
Thos. Beaulieu.....	do do .....	do ..	Not stated.	.....	do ..	do
Jérôme Bernier.....	do do .....	do ..	801 86	.....	do ..	do
Chrysostôme Bernier.....	do do .....	do ..	189 80	.....	do ..	do
Adolphe Ols.....	do do .....	do ..	22 00	.....	.....	do
D. Robitaille.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 17.....	do ..	46 20	.....	.....	do
D. McLeod.....	do do .....	do ..	54 60	.....	.....	do
Isaac Ritchot.....	do do .....	do ..	278 96	.....	.....	do
Pierre Desjardins .....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 1.....	Aug. 19, 1876..	130 00	.....	.....	do
Jean Berubé.....	do do .....	do ..	153 33	.....	.....	do
François LeBel .....	do do .....	do ..	476 00	.....	.....	do
Jérémie LeBel .....	do do .....	do ..	430 96	.....	.....	do

J. Candide Dion.....	do	do	do	50 00			
Wm. Simard.....	do	do	do	182 33			
Hilaire Dubé.....	do	do	do	75 00			
Jude Ouellette.....	do	do	do	333 33			
Alexis Leclerc.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 2.....	do	do	416 66			
Ulgère Dion.....	do	do	do	100 00			
Théophile Bélanger.....	do	do	do	62 00			
Nazaire Tétu.....	do	do	do	333 34	60 00	Jan. 22, 1877..	
Magloire Dubé.....	do	do	do	284 00			
Cyrille Gagnon.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 8.....	do	do	566 66			
Joseph St. Laurent.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 17.....	do	do	200 00	Nil.	Jan. 22, 1877..	
Napoléon Côté.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 1.....	do	do	130 00			
Hilaire Dubé.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 2.....	do	do	60 00			
Narcisse Belleisle.....	do	do	do	80 00			
Widow Théo. Soucy.....	do	do	do	100 00			
Sifroi Dubé.....	do	do	do	100 00			
Vital Rioux.....	do	do	do	40 00			
Joseph Michaud.....	do	do	do	40 00			
Napoléon Rioux.....	do	do	do	50 00			
do	do	do	do	181 25			
Jules Larivière.....	do	do	do	80 00			
Hermidas Denis.....	do	do	do	90 00			
Celestin Bernier.....	do	do	do	Not stated.			
Widow P. Garant.....	do	do	do	Not stated.			
Cyriac Dastous.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 6.....	do	do	20 00			
Magloire Dubé.....	do	do	do	Not stated.			
Fabien Ouellet.....	do	do	do	18 00			
Lucien Bélanger.....	do	do	do	300 00			
Joseph Heppel.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 8.....	do	do	380 00	Nil.	Jan. 22, 1877..	
Ignace St. Pierre.....	do	do	do	Not stated.		do	
John Smith.....	do	do	do	300 00	25 00	do	
Esdraas Dechêne.....	do	do	do	35 00			
Lazare Verreault.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 13.....	do	do	230 00	Nil.	Jan. 22, 1877..	

Sept. 5, 1876..

## APPENDIX No. 18.—Statement of Claims referred to and arbitrated upon by the Official Arbitrators, &amp;c.—Continued.

Claimant.	Subject of Claim.	Date of reference to Arbitration.	Amount claimed. \$ cts.	Amount awarded. \$ cts.	Date of Award.	Remarks.
Marcel Brochu .....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 14.....	Sept. 5, 1878..	260 00	15 00	.....	
A. Poirier .....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 17.....	do	60 00	.....	.....	
Hubert St. Laurent.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 8.....	do	150 00	10 00	.....	
Joseph St. Laurent .....	do do	do	1,000 00	.....	.....	
Pierre Dumont.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 1.....	Oct. 4, 1878..	181 33	.....	.....	
Elie Martin.....	do do	do	136 00	.....	.....	
Prudent Caillouet.....	do do	do	100 60	.....	.....	
Hypolite Lapointe .....	do do	do	Not stated.	.....	.....	
Jos. Dubé.....	do do	do	150 00	.....	.....	
Jos. Caron .....	do do	do	50 00	.....	.....	
Xavier Terriault.....	do do	do	168 66	.....	.....	
John Clark.....	do do	do	Not stated.	.....	.....	
Narcisse Dumas.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 2.....	do	Not stated.	.....	.....	
F. X. Godbout.....	do do	do	Not stated.	.....	.....	
Absalon Leclerc.....	do do	do	200 00	.....	.....	
Louis Turcot.....	do do	do	60 00	.....	.....	
Widow Jonas Rioux .....	do do	do	60 00	.....	.....	
Joseph Parent.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 5.....	do	100 00	.....	.....	
André Parent.....	do do	do	80 00	.....	.....	
Pierre Gagnon.....	do do	do	150 00	.....	.....	
G. St. Pierre and his wife,	do do	do	575 00	.....	.....	
Eloise Fraser.....	do do	do	202 66	.....	.....	
Ohas. Lepage.....	do do	do	.....	.....	.....	

Jean Langis.....	do	...	33 33	.....
Micene Patry.....	do	...	33 33	.....
Basile Oôté.....	do	...	Not stated.	.....
François Parent.....	do	...	112 00	.....
Joseph Parent and Angèle Caron.....	do	...	204 00	.....
Victor Réhel.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 8.....	do	220 00	.....
Jules Michand.....	do	do	300 00	.....
P. Beauville.....	do	do	300 00	.....
Sylvain Lavoie.....	do	do	500 00	.....
Alex. de Champlain.....	do	do	85 00	.....
Octave Oôté.....	do	do	200 00	.....
Julien St. Laurent.....	do	do	Not stated.	.....
Alfred Blais.....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 17.....	do	50 00	.....
I. K. Ward.....	Land taken, &c., for Lachine Canal enlargement.....	Feb. 2, 1877..	40,899 75	.....
W. Evans.....	do	Feb. 3, 1877..	8,701 53	.....
L. Fauteux.....	do	do	9,442 63	.....
A. St. Denis.....	Land taken for Carillon Canal en- largement.....	March 12, 1877.	Not stated.	.....
Estate late Hon. Wm. Chip- man.....	Land taken, &c., by Intercolonial Railway, for depot, grounds, &c., at St. John, N.B.....	April 5, 1877..	114,430 40	.....
F. X. Jary.....	Land taken for Lachine Canal en- largement.....	June 20, 1877..	2,981 76	.....

F. H. ENNIS,  
Secretary, O. A.

OTTAWA, 27th November, 1877.



## APPENDIX No. 19.

### BRITISH COLUMBIA.

PUBLIC WORKS DEPARTMENT,  
VICTORIA, BRITISH COLUMBIA, 20th July, 1877.

SIR,—I have the honor to report on the works under my charge during the fiscal year 1876–77, together with a statement of amounts received on revenue account, rents, sales of land, Government property, &c. :

#### *Penitentiary.*

The contract for this work was executed on the 31st October, 1874. The time specified for the completion of the works was 30th September, 1876. The work embraced in the contract was completed on 6th March, 1877. The Contractors allege that the delay in the completion of the work was due to the neglect of the Government in not furnishing the grates. This argument is not a valid one, inasmuch as the Government agreed only to find the grates, but not by any particular date, and had moreover a perfect right to elect to have open fireplaces in lieu of grates. In point of fact, the work was not and could not, independently of the grates and mantels, have been completed by the time specified in the contract. The whole of the work has been satisfactorily performed, excepting the pointing of the exterior walls of the basement. During my inspection last November, I observed that this pointing had not hardened, and that in places it had crumbled away, and directed the Contractors to rake out the joints and repoint all defective portions. This they did, under the close inspection of the clerk of the works, and still it does not harden. It is the opinion of practical men here, that the mortar mixed with iron filings and forge ashes is not suitable for the damp climate of New Westminster. The repointing with cement can be done hereafter for about \$200.

We are at present engaged in bringing in water to the building by means of iron pipes communicating with a dam across the stream at a point about 3,600 feet from the building. This dam will be about 4 feet high. A pipe  $1\frac{1}{2}$  inches in diameter will give a supply of 259 gallons an hour, a 2-inch pipe 504 gallons : either of which will give an amply supply for ordinary use as well as in case of fire. The cost of this water supply will be about \$3,125.

The following is an abstract of payments made on account of the Penitentiary in this Province to 30th June, 1877.

Surveys of site and inspection .....	\$	517 00	
Wages of Clerk of works.....		3,120 00	
Corridor locks, extra work on locks, freight, &c., &c....		638 68	
Stoves and cooking range.....		325 13	
Miscellaneous .....		13 2	
Wages of caretaker.....		227 00	
			4,967 53
Estimated cost of water supply.....	\$	3,125 00	
do furniture and fittings,			
excepting those for hospital.....		2,300 00	
			5,425 00
Amount of original contract.....	139,305 00		
do authorized extras.....	280 00		
			139,585 00
			<u>\$149,977 53</u>

There is also a further sum which the Contractors claim to be due them, which is now under consideration and against which I have thought it my duty to bring a set-off for the substitution by the Contractors, with my consent, of cedar in lieu of white pine for the joiner work. Reports in full on these points, have been submitted by me under date 22nd March and 1st June last.

The building will be ready for occupation by about the end of October.

### *Dredging.*

No dredging operations have been carried on this year. The vessel and steam tug have been in charge of a caretaker, who besides his regular duty, has given each of them a coat of paint or tar, and is now engaged in replacing broken or damaged sheets of copper on the hull of the dredge. A survey was held, by a proposed charterer, on the tug, and she has been pronounced perfectly sound. She requires a new plate of iron to connect the stern post with the keel, which will cost probably \$25.00. I have caused a survey of the dredge to be held by an experienced shipwright, and I regret to state that he reports her upper works very much decayed in places, and that to make her perfectly fit for her heavy work, an expenditure of from \$3,000 to \$4,000 will be required, and that this will occupy at least three months. The hull below the water, and her internal frame and timbers are quite sound, and her machinery and boiler are in an excellent condition. She is a valuable and costly vessel, and capable of doing an immense amount of work, and I would suggest the expediency of having her put into repair next year, even though dredging operations be not resumed.

The total expenditure for the year has been:

Wages of caretaker.....	\$480 00
Paint, coal tar and assistance in towing.....	86 62
	<u>\$566 62</u>

### *Beaver Rock.*

I regret to be compelled to again report that this work is still unfinished, though progressing very slowly every day. There would appear to be no advantage to the Government or to the public in stopping it, as it would be impossible to relet the contract to any responsible person for the same sum. In my last annual report I gave a detailed account of the interesting operation of blasting the rock, and the opinion then expressed as to the efficacy of the blast is still held by me, although it is impossible to confirm it at present, as the shattered rock is piled up in huge masses and more or less covered with silt and clay from the coffer dam. The contractor has removed, according to the report of the dredge keeper, whom I have placed for this purpose in charge, to the 30th June ..... 253 tons.

The total amount to be removed is..... 1,768 "

Leaving to be removed on 1st July..... 1,515

The operation of getting up the rock by means of a diving bell is necessarily a slow one. Each large rock has to be slung by men below in chains and hoisted up to the deck of the scow. Very large rocks have to be again broken by means of dynamite. The smaller ones are placed in a wire crib and then hoisted up.

The rate of removal hitherto has been about 90 tons a month, but as a marked improvement in this respect has taken place lately, I think we may fairly expect that the monthly quantity will be about 130 tons. Last week the Contractor took up 40 tons.

The amount agreed to be paid was.....	\$11,950.00
" " certified under Progreys estimate No. 1, less drawback, was.....	2,987.50
The amount paid to Contractor was.....	<u>2,240.63</u>

I have agreed with the Contractor to allow him to sell the rock and pay one third of the proceeds to the Government.

*Custom House, Victoria.*

Water at a high pressure has been brought into this building, and suitable hose to be used in case of fire has been provided. Government vessels will draw their supply from here. Total cost of this work has been \$207.25.

*Post Office building.*

The roof of this building has received its usual coat of paint at a cost of \$35.50.

Flag poles and Dominion flags were provided in honor of the visit of his Excellency the Governor General at a cost of \$60.75.

The sum of \$160 has been expended in replacing the four stone sills which were damaged, I believe, during the conflagration on opposite side of street.

The sum of \$94.50 has been expended in the purchase of hose and fitting a supply pipe in the hall to be used in case of fire.

*Telegraph maintenance.*

During the past year I am happy to be able to report that no break has occurred in the submerged cables. The land portion of the line is in fair working order, although many miles of poles are required to make the line perfect. Most of the ordinary repairs are performed by the operators, but during severe storms and heavy falls of snow, extra men have to be employed. The line will always be a difficult and expensive one to maintain, as the country over which it passes is so rugged and sparsely settled. The poles are for the most part those which were originally set in 1865 and from constant cutting and resetting they have become too short and unfit for the work. If a sufficient sum were expended in setting new ones, a very material reduction in the monthly expenditure would result.

We have on hand 4 miles of new submerged cable and  $2\frac{1}{2}$  miles of old but serviceable cable. This will be used more or less in repairing the break which has just occurred and which I reported under date 18th July. We have also on hand about 12 miles of new land *galvanized* wire, which we propose to use at once in place of the old *black* wire which is very rotten from oxidization and which is constantly breaking. The following is an abstract of the expenditure for the fiscal year under the head of service.

Salaries .....	\$17,825 00
Rent .....	396 00
Hire of horses regularly employed.....	1,080 00
Hire of extra assistance in men and horses and sustenance of same whilst employed in repairs.....	2,487 47
Purchase and freight of 12M new wire.....	2,462 59
Special repairs to line.....	1,616 77
Postage.....	81 16
Printing.....	227 50
Travelling expenses of Superintendent.....	289 00
Transport of operators, &c.....	136 00
Repairs of telegraph scow.....	507 25
Subsidy to Western Union Telegraph Co., for 1 year.....	4,000 00
	<hr/>
	\$31,108 74

*Land sales.*

Application was made to purchase lot 4, Block V, New Westminster City. This application was referred by me to Ottawa, with a recommendation that it should be sold by public auction at the upset price of \$1,600. The auctioneer's estimate of its value was \$1,300. The lot was sold by auction on 26th May to Messrs. Macnamara and McGill for the sum of \$2,225 payable in 3 instalments, monthly, without interest. The first instalment of \$1000 was paid on day of sale, and the second of \$500 was paid on the 25th of June. The total charges for commission (5 p. c.) and advertising amounted to \$135.50.

The second instalment of \$180 due on eastern half of lot 5, Block XIV, New Westminster City, sold to Mr. J. K. Suter the previous year, was paid by him on 29th June, amounting to \$180 with interest at 7 per cent for 1 year, amounting to \$12.60.

*Mint Engine and Boiler.*

The balance due by Messrs Muirhead and Mann on the purchase money of this engine, amounting to \$630.00, was paid on 18th August.

*Rents of Lots and Buildings.*

The following is a list of the sums received by me during the fiscal year, by way of rental from tenants holding under the Government of the Dominion.

Jonathan Nurcy, in full to 30th June.....	\$ 36 00
Henry Holbrook, do do .....	166 00
Edward Dickenson do do .....	60 00
Adolphus Peek, on account.....	40 00
	<u>\$302 00</u>

*List of arrears due for rent to 30th June.*

John Kinsman.....	\$ 60 00
Adolphus Peek.....	65 00
	<u>\$125 00</u>

*Revenue received from Telegraph Line.*

1876.		Dep. receipt.	Amount received.
Sept. 4	July.....	1183	\$647 10
" 29	August .....	1268	697 25
Oct. 23	September .....	1347	758 33
Nov. 24	October.....	1462	760 74
" 29	Refund of taxes by Western Union Teleg. Co. 1874-75	1473	41 50
Dec. 28	November.....	1565	686 87
Feb. 2	December .....	1691	469 50
" 28	January .....	1792	361 00
March 22	February.....	1891	216 00
April 23	March (part).....	2026	502 45
" 27	do (balance) .....	2048	50 00
May 30	April .....	2187	534 20
June 21	May.....	2298	885 33
July 13	June .....	2421	757 15
			<u>\$7,367 42</u>

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The falling off in the revenue this year is attributed by the Superintendent to the depression in mining and commercial centres, but it is confidently expected that a new impetus will be given to the former industry during the coming year, and that this will materially increase the use of the Provincial Telegraph.

I have the honor to be, Sir,  
Your obedient servant,

B. W. PEARSE,  
*Resident Engineer.*

F. BRAUN, Esq., Secretary,  
Public Works Department,  
Ottawa.

## APPENDIX No. 20.

### PRINCE EDWARD ISLAND RAILWAY.

RAILWAY DEPARTMENT,  
MONTREAL, October, 1877.

SIR,—I now enclose you the accounts for the working of the Prince-Edward Island Railway for the year ended 30th June, 1877.

The returns are 13 in number and are classified as follows :

1. Statement of capital account.
2. Detailed statement of capital expenditure.
3. Revenue account.
4. Locomotive expenses.
5. Car " "
6. Maintenance of way expenses.
7. Station expenses.
8. General charges.
9. Renewals of permanent way.
10. Monthly receipts.
11. Store account.
12. General balance.
13. Comparative statement of averages.

I also transmit herewith copies of reports made to me by the Superintendent, the Engineer, and the Mechanical Superintendent, with their annexed details.

#### CAPITAL ACCOUNT.

The total cost of the railway now amounts to the sum of \$3,403,367.84, which includes the outlay of \$200,000 voted by Parliament for improving the physical condition of the railway and increasing the rolling stock.

That outlay has been completed and the railway is now in a very much improved condition.

The ordinary fencing is now in a satisfactory state, except for about 40 miles between Wellington and Alberton. The renewal of this portion of the old wire fence is being gradually effected.

The snow fencing erected during the year, proved of very great service during the winter, and not only diminished the cost of working, but greatly improved the regularity of the train service.

Additions are now being made to this protection from snow, and still more satisfactory results are hoped for during the coming winter.

The shops, machinery and additional rolling stock, which have been provided, have enabled the work to be performed in a much more satisfactory and economical manner than formerly, and until the traffic shews symptoms of increased activity, I do not recommend any addition to the rolling stock.

A grain warehouse at Charlottetown, capable of holding about 150,000 bushels of grain, would be of great advantage, and I recommend that it be erected next summer. The cost would be about \$12,000

## REVENUE ACCOUNT.

The gross receipts amounted to the sum of.....	\$130,664 92
Against, in the previous year.....	118,060 96

Being an increase of..... \$ 12,603 92

There was a decrease in the passenger traffic of \$4,647.83, and an increase in the freight of \$17,908.64.

The number of passengers carried in 1877 was 93,478, and in 1876 93,968, or a decrease of 490.

The reduction of receipts is mainly due to the putting on of second class cars, and the issue of return tickets at reduced rates.

The number of tons of freight carried in 1877 was 41,039, as against 29,358 tons in 1876, or an increase of 12,681 tons.

During the four months of January, February, March and April 1876, the gross traffic was \$22,063, and for the same months in 1877, it amounted to \$31,017, or an increase of \$8,954. This would lead to the hope that the improving regularity of working will increase the winter traffic. This may be further increased, if the communication between the main land and the Island by the "Northern Light," continues to be successful. Arrangements are now being perfected, to greatly improve the communication between the steamer and the railway stations, on both sides of the Straits; and this will doubtless considerably increase this traffic, both in passengers and freight.

## WORKING EXPENSES.

The ordinary working expenses for the year ended	
30th June, 1877, amounted to.....	\$210,329 08
For the previous year they were.....	214,930 43

Being a decrease of..... \$ 4,600 35

The substitution of heavier steel rails for the light iron rails, which are wearing so rapidly, as stated in my last report, has caused an expenditure of \$18,266.17 as per abstract No. 9.

The account therefore stands thus:

	1876.	1877.
Gross receipts.....	\$118,060 96	\$130,664 92
Ordinary expenses .....	214,930 43	210,329 08
Renewals of rails .....		18,266 17
Total.....	\$214,930 43	\$228,595 25
Total loss.....	\$ 96,869 47	\$ 97,930 33

It would thus seem that the renewals required have been effected without materially increasing the loss for the year.

Sleepers are now requiring renewal also. About 35,000 will be put in during the current year. Another 500 tons of steel rails weighing 60 lbs. to the yard, have been ordered for the current year. The extremely sharp curves and steep gradients are telling rapidly upon the light iron rails, especially between Charlottetown and Summerside, where the traffic is the heaviest.

The locomotive charges are lower, the improvements made in the engines, having proved to be very valuable.

The car expenses are higher, and will continue to be large, until the improvements now being made in the car stock, are completed.

The use of larger wheels, as the present small ones wear out, is proving of great advantage, especially in winter. The old trucks were too weak, and are constantly breaking down, and are being replaced by stronger ones.

The ballasting and drainage which has been executed has greatly improved the track, but a good deal of ballasting has yet to be done.

The condition of the masonry on the line has been largely improved, and the outlay on this item will not be very large in future.

The wooden bridging has also had very considerable improvements and repairs.

The expenditure upon buildings and wharves, has been heavy, and will continue to be so, until all the original structures, which were built in a cheap manner, have been overhauled and repaired.

The fact is, that the whole line and rolling stock, are going through a process of reconstruction, owing to original defects, and this will make the working expenses heavy for several years.

#### STORES.

The stock of stores, on the 30th June, 1877, was as follows :

Ordinary stores.....	\$30,339 92
Coal .....	6,815 77
Rails, new and old.....	11,457 74
Total.....	\$48,613 43

The last item will probably increase, whilst the process of substituting steel for iron rails continues.

The cost of working per train mile run, was 85.74cts. in 1877, exclusive of rail renewals, or 93.88cts. including the renewals, against 93.06cts. in 1876, without any renewals.

The present station at Souris is very badly placed, both for the local trade and for shipping purposes. Now that the breakwater there is completed, and a good safe harbour provided at Souris, I recommend that the station be changed, so as properly to accommodate the growing trade of that place, and, to put the railway in proper communication with the new harbour for shipping purposes.

A great improvement can be made in the curvature of the line, at a not very large expenditure.

Plans for this purpose are being prepared. A comparatively moderate outlay would shorten the distance between Charlottetown and Summerside by about five miles, and greatly improve the line, both as regards safety and economy of working.

The whole line is now in a fair condition, but as I have already stated the cost of working will be large for several years owing to the original plan of the road being faulty.

I have the honour to be, Sir,  
Your obedient Servant,

C. J. BRYDGES,  
*General Superintendent of Government Railways.*

J. BRAUN, Esq., Secretary,  
Department of Public Works,  
Ottawa.



## PRINCE EDWARD ISLAND RAILWAY.

### SUPERINTENDENT'S REPORT.

GENERAL OFFICES,

CHARLOTTETOWN, August 15, 1877.

SIR,—I have the honor to transmit herewith statements and reports relating to the operations of this Railway for the fiscal year ended 30th June, 1877.

### CAPITAL ACCOUNT.

This being more immediately under the control of the General Superintendent I shall not go much into detail.

The four Kingston Locomotives added to our stock during the first two months of this fiscal year are giving very good satisfaction and have enabled us to move the increased freight with ease, avoiding the delays and annoyances of the previous year, consequent upon the constant breaking down of the tank engines, large and small. These tank engines, on account of their boilers not being large enough for their cylinders, make very poor work on the main line unless with a very light load, say three to five cars at most, and are only good for shunting purposes. They are able for quite heavy lifts in a yard and would be very useful in coal pits.

I would recommend the sale of six of them for such purposes, and that four large engines similar to those lately purchased be procured in their stead. The additional box cars received during the year, raising the total number to 150 fully meet our wants for the present. The new cars being well built and carrying ten tons each, are much in demand. The same applies to the new flat cars. The number, however, 100 new and old is not sufficient for our wants; what with coal and ballast trains in addition to the ordinary traffic, we are often unable to supply cars when wanted for traffic purposes.

I would therefore recommend a further addition of twenty-five flat cars.

These could easily be made in our own shops, where we now have all suitable machinery and every required facility.

The new shops and the enlargement in Charlottetown yard add greatly to the efficiency of the establishment and will result in greater economy in the future.

The extension of the Charlottetown freight shed having been much required, is giving good satisfaction. A further addition will, however, soon be needed in consequence of the rapidly increasing traffic.

At Summerside the new station building, with the improvements upon the wharf and the increased freight shed accommodation, cannot fail to give satisfaction.

The new stations at County Line and Morrell are found to be a great improvement upon those built by the Contractors, being better adapted for the business, and affording as they do comfortable dwelling rooms for the agents, enabling them to be on duty at all hours when required, which is a very desirable object, the want of which is very much felt at almost all the other stations, so much so, that I would strongly urge the immediate construction of suitable dwellings at each not now so provided. The cost will not exceed \$500 per dwelling.

The new fence from Georgetown to Miscouche is doing good service, claims for cattle killed on this portion of the road having almost entirely ceased, whereas on the portion still nominally protected by wire fence, the slaughter of horses, cattle and sheep has been very great, so much so, that I would respectfully urge that no time be lost in replacing it with good board or rail fencing.

The newly erected snow fences materially assisted in keeping the road open last winter, although, being on account of the narrowness of the roadway, too near the track, they did not answer the purpose as well as they would otherwise have done.

The Engineer is now engaged in purchasing land and moving these fences back and in erecting more in places where last winter's experience demonstrated the necessity.

We shall be in a much better position for contending with snow in the coming winter than in either of the two previous seasons.

#### REVENUE ACCOUNT.

This railway having been in operation for two complete years we are enabled to make comparisons with the results of a previous year.

Earnings year ending 30 June, 1876.....	\$118,060 96.	For 1877	\$130,664 92
Expenses do do .....	214,930 43.		210,329 08
Loss.....	96,869 47		79,665 16
Working expenses per mile of road, 1876....	\$1,096 58 cts.		
do do 1877....	1,073 11 "	Decrease	\$23 47
do per train mile, 1876....	93.06 cts.		
do do 1877....	85.74 "	do	7.32 cts

There not having been any outlay on account of renewals during the former year we are unable to compare.

Loss for year ended June 30, 1877.....	\$79,665 16
Add cost of renewals of permanent way.....	18,266 17

Total loss on year's operations..... \$97,931 33

You will observe (statement No. 3) there is a net increase in earnings of \$12,603.96, and a decrease in working expenses of \$4,601.35.

The increase in earnings is confined entirely to the freight business which shows a gain of \$17,908.64, whereas the passenger traffic has declined \$4,647.83, and the mails and sundries \$656.85. The satisfactory result of the freight traffic may be attributed to several causes,—primarily, the abundant harvest with which the whole Island had been favored, secondly, the gradual withdrawal of business from the old water channels of communication to the railway.

By referring to the descriptive statement you will perceive the increase consists principally in the carriage of oats, potatoes, flour, oysters, timber, live stock and general merchandise. The fishing business was almost a failure, which will account for the decrease in the traffic resulting therefrom.

The decrease in the passenger traffic arises from two causes, first the novelty having worn off, people did not travel so much for pleasure as during the first few months after the opening of the road. The main cause, however, lies in the lowering of fares by the introduction of second class tickets and the issue of return tickets at reduced fares to all stations both flag and regular, which, without increasing the number of passengers, materially lessened the amount of revenue; the receipts for each passenger being 64.57 cts. for 1877, against 69.70 cts. in previous year.

The decrease in mails and sundries arises from the discontinuance of the express business, the receipts from which were formerly included in sundries.

#### WORKING EXPENSES.

You will observe there is a decrease in every item of working expense (see Report No. 3), car expenses excepted, which shows an increase of \$6,253.85. This was necessitated altogether by the inferior character of the old rolling stock—the passenger coaches requiring extensive alterations and strengthening.

The trucks under the box and flat cars being too weak, and the wheels too small, we are being forced to renew them by substituting 33-inch wheels and trucks in proportion. Were it not for this, our car expenses would also have shewn a reduction. This expenditure will not cease until all those trucks have been renewed.

The amount expended in 1876 for repairs of engines tenders and engine tools was \$26,075.63 against \$17,540.87 for 1877, shewing a saving of \$8,534.76. This is the result of the large expenditure of the previous year having brought the locomotives up to a good working condition.

The method adopted last winter of building snow ploughs upon the tank engines, acted admirably; bringing the power and the work to be accomplished much closer together (a very desirable object upon the many sharp curves of this Railway). The great weight also of these locomotive ploughs prevented their leaving the track, whereas during the previous winter it was almost impossible to keep the wooden ploughs on the track.

The decrease in the cost of shovelling snow, caused by the snow fences and the improved snow ploughs, added to the increase in earnings during the months of last winter, consequent upon the more regular running of trains, is almost sufficient to cover the cost of both snow fences and improved ploughs. This being the result of only one year's operations, demonstrates the wisdom of the expenditure incurred.

Cost of clearing ice and snow, 1876.....	\$19,089 27		
do do 1877.....	7,617 23	Saving	\$11,472
Earnings Jan., Feb., March and April, 1876....	\$22,063 00		
do do 1877....	31,019 00	Increase	\$8,956
Total saving and increased earnings consequent upon the improved means of contending with ice and snow.....			\$20,428

We have a very good excursion business during the summer months, in order to meet the requirements of which we are forced to put temporary seats in box and flat cars, at considerable cost and inconvenience. I would advise that authority be given us to build, say six large plain inexpensive carriages with wooden seats suitable for such occasions.

There is a very great want for storage accommodation on Charlottetown wharf. During the busy seasons in the fall and spring we are forced at times to allow cars to lie two and three days before being discharged, and although demurrage is charged the business is nevertheless delayed.

I would recommend that a warehouse be constructed with a capacity of 150,000 bushels, which would enable us to have all cars promptly discharged and thus virtually add to their carrying power. A storage charge upon all grain going into said warehouse (to which shippers would not object) would, I have not the least doubt, pay a fair rent on the cost of the building.

The practice heretofore has been for merchants to refrain from buying until the fall fleet came in, when a great effort had to be made in order to get the vessels loaded and away before the ice formed. Now with such a warehouse they could begin to buy along the line of the railway, as soon as threshing would begin and have the warehouse full before the fleet arrived, which also could be loaded and despatched much earlier in consequence. It would also be of great service for the storage of grain purchased during winter for shipment by the spring fleet.

#### STORES.

Supplies are purchased by tender as heretofore.

Our stock at the end of the year, including ordinary stores, fuel, rails and fastenings on hand amounts to \$48,613.43. We are forced to keep on hand a larger stock on account of our isolated position than would otherwise be necessary.

We are paying for coal delivered at Georgetown, Charlottetown and Summerside \$2.69 per ton, which is much less than we were able to purchase it for heretofore.

#### CASUALTIES.

September 15, 1876, 7.15 A.M., Summerside. Allen McMillan, engine cleaner, went under engine to rake out ashes. The engine driver not knowing that he was there started the engine, hauling McMillan some ten feet and bruising him severely. He has since recovered but complains at times of internal weakness.

November 9, 1876, 9.35 A.M., at O'Leary Station. Alex. Beaton was standing on step of engine. When train started he fell between car steps and platform and was bruised severely, but has since recovered without permanent injury. He was neither a passenger nor an employé and had no right on step of engine.

February 28, 1877, 12.33 A.M., County Line Station. Conductor W. A. Archibald killed. He was on flanger car just leaving County Line yard, looking out of side door when car rubbed against a snow bank, suddenly closing the door, catching his head in so doing. Verdict of inquest, "That the deceased came to his death from fracture of the base of the skull caused by the unnoticed closing of the sliding door of the flanger car on which he was on duty." By the death of conductor Archibald, the Government lose the services of a valuable servant. He was a general favourite both with the travelling public and his fellow employes.

March 5, 1877, 7.45 P.M., near Harmony Station. Mrs. McDonald, collar-bone broken. Car ran off track and fell on its side, throwing Mrs. McDonald across the car.

We are very happy to be able to draw your attention to the fact that with the exception of the slight injury to Mrs. McDonald, not a passenger has been either injured or killed since the opening of this Railway.

I have the honour to be, Sir,  
Your obedient Servant,

W. McKECHNIE,  
*Superintendent.*

C. J. BRYDGES, Esq.,  
General Superintendent Government Railways,  
Montreal.

## PRINCE EDWARD ISLAND RAILWAY.

DESCRIPTIVE statement of Freight earnings for the Year ended 30th June, 1877.

Description of Freight.	Quantities.		Tons.		Amount.	
	1876.	1877.	1876.	1877.	1876.	1877.
Oats..... Bush.	393,890	628,792	7,036	10,699	9,230 79	14,178 30
Wheat and other grains..... "	3,243	2,030	66	50	55 84	102 71
Potatoes and roots..... "	5,938	174,911	146	5,434	339 38	7,470 84
Flour..... Brls.	19,032	29,437	1,893	2,945	3,394 74	4,758 85
Mackerel..... "	2,275	3,053	341	458	641 24	589 14
Herrings..... "	4,549	2,615	679	394	1,245 37	632 31
Cod and other Fish..... "			171	244	375 19	425 87
Oysters..... "	1,728	3,222	172	322	328 31	534 18
Fish barrels..... No.	8,996	6,394	141	100	111 51	323 71
Timber hewn and unhewn .... C. ft.	218,211	241,246	6,261	6,791	5,517 39	6,082 83
Lumber sawn..... L. ft.	1,212,401	1,188,380	1,708	1,524	1,656 13	1,338 69
Shingles..... "			402	585	450 99	650 75
Cordwood and tan bark..... Cords	706	837	1,154	1,351	706 24	965 20
Coal..... Cars.	80	59	368	481	248 79	332 55
Lime..... Brls.	1,730	1,453	258	181	185 83	198 74
Limestone..... Cars	69	46	552	379	291 04	203 16
Brick and building stone..... "	41	38	305	303	199 80	205 35
Salt..... "			219	347	288 56	380 86
Live stock, all kinds..... No.	710	1,823	195	469	571 06	1,005 12
Mussel mud..... Cars		27		270		170 10
Fresh beef..... "				29		107 12
Pork in carcass..... "			140	213	370 27	577 68
Pork in barrels..... Brls.	740	1,193	112	179	279 23	294 75
Butter..... "			7	20	29 85	77 99
Eggs..... Pkgs.	3,647	6,243	173	240	587 79	745 80
Merchandise..... "			5,859	7,031	17,254 72	20,053 31
Wharfage, storage, etc..... "					722 73	807 52
			28,358	41,039	45,304 79	63,213 43

## STATEMENT OF PASSENGER TRAFFIC.

	1876.	1877.
Total number carried.....	93,968	93,478
Receipts.....	\$65,005.24	\$60,357 41
Receipts for each passenger.....	69.70 cts.	65.57 cts.

W. McKECHNIE,  
Superintendent.

## PRINCE-EDWARD ISLAND RAILWAY.

### ENGINEER'S DEPARTMENT,

CHARLOTTETOWN, 30th June, 1877.

SIR,—I have the honor to submit the following report on the working of my Department, during the fiscal year now ended.

### MAINTENANCE.

The total expense of maintenance of road, including repairs to buildings, bridges, wharves, &c., together with the removal of ice and snow amounts to \$72,493.24, shewing a decrease of \$6,463.09 as compared with last year (see statement No. 6). This decrease was effected during the winter and spring months, and was due to the much improved condition of the track, owing to the expenditure that had been made on it during the summer of 1876.

Early in July of last year the section gangs throughout the line were doubled, and the whole track lifted, and packed up with ballast. The extra cost of this, amounting to \$8,926.88, was charged against capital. The effect was to render the track much drier and firmer, and less liable to heaving from the frost, and in the spring months the running of the trains was much safer than previously.

The cost of "Repairs of Track" (being chiefly section men's wages) this year was \$36,282.79, against \$40,002.72, shewing a decrease of \$3,719.93. The total cost of maintenance for the three spring months, April, May and June, of this year, was \$12,267.23 against \$19,317.15 for corresponding months last year, shewing a decrease of \$7,049.92.

A considerable amount must still be expended in ballasting before the line can be considered satisfactory.

2,681 sleepers have been used in ordinary repairs. The stock of sleepers was very small, and it was found necessary this spring to renew a considerable number—under the head of renewals (statement No. 9) 1,600 sleepers are charged.

46 $\frac{1}{2}$  tons of new iron rails and 34 tons of old rails have been used in repairs, lengthening sidings, &c.

In November last the 46.10 tons of rails above mentioned were all that we had in stock, and an additional supply of old rails for repairs through the line, ballasting, sidings, &c., was obtained by taking the rails from Charlottetown to Royalty Junction, a distance of 5 $\frac{1}{2}$  miles, and relaying with steel.

29,618 lbs. of spikes have been used in the track.

A sum of \$2,168.06 has been expended on repairs of bridges, as against \$712.01 during the previous year.

This expenditure was necessary in order to widen the bridges, and put on guard stringers, so as to give greater strength and security. In the case of Scrimgeours Bridge, near Georgetown, the masonry abutments shewed indications of giving way, and in order to render the bridge secure it was found necessary to rebuild from deeper foundations. The new foundations were sunk 8 feet lower than originally. Ten bridges have been strengthened and widened, representing a total length of 475 feet.

During the present season it is intended to widen and strengthen 11 bridges, having a total length of 693 feet 6 inches. The total length of bridging of the line is 2,462 feet.

A total sum of \$7,141.74 has been expended on "Repairs of Buildings," as against \$3,343.61 of the previous year, being an increase of \$3,798.13. Of this sum \$2,841.46

though charged under head of repairs is in reality for small works of construction executed at different parts of the line. The following is a list of such works :

Coal sheds at Port Hill and Harmony.

Tank houses at Mount Stewart (burnt) and Wellington.

Accommodation for news agent at Charlottetown.

Platforms at Souris and Royalty Junction.

Engine shed at Mount Stewart.

Anthracite coal shed, ice house and car tenders room, Charlottetown.

Engine pits in Round House, Charlottetown.

Placing blacksmith shop, Charlottetown, on piles.

The amount expended in actual repairs on buildings is therefore \$4,300.28.

Windmills have been erected at various watering stations, throughout the line for the purpose of pumping water. Their working has been extremely satisfactory since they were erected last summer, and the cost of pumping water will be reduced 75 per cent.

The mills are "Stovers Patent" and were erected complete by Mr. A. B. Almond of Halifax, at a cost of \$210 per mill, including pump gearing, &c. The following is a list of places where these mills have been put up :

Georgetown,  
Baldwin's,  
Mount Stewart,  
Union,  
Charlottetown,

Milton,  
Blueshank,  
Wellington,  
Morell,  
Harmony.

Under the heading "Station Yards and Approaches" a sum of \$1,315.73 has been expended, as against \$112.56, shewing an increase of \$1,203.17. It was found necessary for the business of the road to grade and clear many of the station yards that had been left in a very unfinished state and to lengthen the sidings: hence the outlay.

The cost of "removing ice and snow" was \$7,617.23, as against \$19,089.27 of the previous year, shewing a decrease of \$11,472.04. This decrease is very largely owing to the erection of snow fences along the line of railway. The snow fall during last winter was not heavy though the temperature was very much lower than for many previous winters.

A sum of \$776.47 was expended on "Turn-tables," being chiefly caused by the necessity for putting in proper trussing and bracing.

The total length of line maintained is 198½ miles, including the Cascumpec and Souris wharf tracks.

The total length of sidings is 9.3 miles. There has been an increase of 1.4 miles of sidings during the year, inclusive of those laid in at Charlottetown and Summerside, and charged against capital.

Enclosed is a comparative statement of the cost of maintenance for this year as compared with last year.

#### RENEWALS.

During the last year the line from Charlottetown to Royalty Junction, a distance of 5½ miles, was renewed with steel rails. The rails are of a heavier section than the iron rails at present in the track, being 50 lbs. to the yard in place of 40 lbs. 397½ tons of steel rails were laid down, and this liberated and made available for repairs and extensions &c., on other parts of the line, 313½ tons of iron rails. The iron rails were considerably worn, particularly on the curves, but can be employed in ballast pits during the ensuing season. The steel rails were laid early in November, and stood the winter well, a marked improvement in the "heaving" of the track being noticeable owing to the greater stiffness of the rail.

16,000 new sleepers have been placed in the track up to date, they are white hemlock and were obtained by tender from D. C. Ramsay at a cost of 10 cents per sleeper.

## CAPITAL.

A total cost of \$121,096.70 has been expended by my department on capital account (See Statement No. 2) up to date. Owing to the dilapidated condition of the wire fence throughout the line it was found necessary to replace it with a post and board fence. Tenders were invited for this in the autumn of 1875, but were not accepted as they were deemed unsatisfactory.

The lowest tender for common pole fence was 79 cents per rod, for post and board fence, \$1.25 per rod, and for snow fence \$3.79 per rod. It was therefore decided to supply the material for the erection of a post and board fence, and to give small contracts at a fixed rate for the labour of erection. In order to arrive at the actual cost of fence erected during the summer of 1876, it is necessary to include a sum of \$5,000 charged in the capital account of 1875-76. When the season's work was completed the account stood as follows:

Post and board fence 55,400½ rods (= 86½ double miles) \$48,184.14 = 86 cts per rod.

Snow fence 6,120 rods (19½ single miles) \$18,732.72 = \$3.06 per rod. This covers the cost of all labour, material, train hire, superintendence and inspection, together with the purchase of additional land for the snow fence.

4,317,000 feet B. M. of boards and scantling were used in the erection of fencing, and twenty-three different parties were employed in supplying this quantity. The average price paid was \$8.78 per M. feet. The price allowed for the labour of erecting the fence was 17 cents per rod except through a distance of 24 miles where the ground being more stoney 20 cents a rod was allowed; the price allowed for erecting snow fencing was 60 cents per rod. \$10 per mile was paid for having the fence thoroughly examined and fence posts cut off evenly. Sixteen contractors were engaged in the work of erecting and six in cutting off posts.

The filling in of yard at Charlottetown, was executed in order to make ground whereon to place the machine shop, car shop and engine house.

A length of 3,490 feet of sidings was laid down in Charlottetown yard to give access to the new shops, etc. Forty-six tons of old rails were used in this work.

Semaphore signals were erected at the following places, viz:

Summerside.....	2
Kensington.....	1
Royalty Junction.....	3
Charlottetown .....	1
Mount Stewart.....	3

Total..... 10

The average cost of these complete was \$155.38 each. They were erected by the carpenters of the Engineer's Department.

The wharf at Summerside as originally constructed was too low and at high tide a very light breeze would cause the sea to break over it washing out the ballast. It was decided to raise the wharf 2 feet higher with timber work, brush and stone. The wharf is 1,733 feet in length by 40 feet wide. 295 tons of timber, 4,303 loads of brush, and 983 cubic yards of stone were used. The cost was \$5,278.75.

The work was done by the Engineer's Department. The material was purchased at a fixed price 48, cents per load being paid for brush, 30 cents per cubic yard for stone, and \$2.25 per ton for timber. The labour was executed under a foreman.

Two section men's houses were erected at Royalty Junction, at a cost of \$380.00 each. The material was supplied by the Railway and a contract entered into with Mr. Michael Sullivan for the erection, for the sum of \$170 per cottage. A further sum of \$90.46 was expended in providing well and pump, and grading. The cottages are rented to section foremen at \$42.00 per annum each.

A machine shop 120 ft. x 40 ft. and engine-house 30 ft. x 26 ft., of native stone, and brick chimney 59 feet in height, were erected in Charlottetown yard. The masonry work was executed directly under the Engineer's Department.



A contract was entered into with Mr. James Barclay for the execution of roofing and all carpenter work for a sum of \$2,586.55.

A car shop 212 ft. x 40 ft., and a blacksmith shop 75 ft. x 25 ft. of wood, were also erected. The contract for these was awarded to Mr. J. Walsh of Charlottetown at \$3,697.65 and \$1,241.05 respectively. Part of the cost of these is charged in the capital account of last year.

The coal shed at Charlottetown was lengthened 100 feet and set on piles along side the wharf, so that vessels discharging coal should be able to place it immediately in the coal shed and thus save handling. The capacity of the shed is 1,500 tons. The labour of driving piles, moving and lengthening the shed, was executed by Mr. Charles Roper for a sum of \$540.00, the material was supplied by the Railway.

A contract for the erection of a station-house and waiting-rooms with agent's dwelling at Summerside, was awarded to Mr. A. Smith of Summerside for the sum of \$3,712.57. The ground plan of the building is 110 feet by 23 feet. It was occupied in October of last year. A further sum of \$545.81 was expended in furnishing and grading.

The coal shed at Summerside was moved and lengthened 100 feet in a similar manner to that at Charlottetown, giving a total length of shed of 200 feet: capacity 1,200 tons.

Mr. C. Roper constructed a crib work to carry the coal shed and moved the old shed for a sum of \$195.00, the material being supplied to him.

The crib work for the extension and the extension itself was executed by Messrs MacDonald and Grady for a sum of \$270.00, the material also being supplied.

A contract for the erection of a station-house with agent's dwelling at County Line, was awarded to Mr. Donald Gouldrup of Evapond for the sum of \$1,982.44. The ground plan is 40x22 feet and it is two stories and a half in height. A further sum of \$437.86 was expended in furnishing, providing well and pump, and grading.

The building was occupied in October.

A contract for the erection of a similar building at Morell was awarded to Mr. Joseph Egan for the sum of \$1,798.22. A further sum of \$540.84 was expended in furnishing, grading and extending siding accommodation. The building was occupied in October.

Two new tanks have been erected at Baldwin's road and Elliott's Mill at a cost of \$1,320.30, including well, wind-mill pumps, etc.

The tank at Baldwin's is pumped by a wind-mill and that at Elliott's is filled by gravitation from a spring.

Eleven cattle pens have been put up at various stations at an average cost of \$81.36 each.

No casualties or accidents worthy of mention have occurred in my Department

I have the honour to be, Sir,

Your most obedient Servant,

GRANVILLE C. CUNNINGHAM,

*Engineer*

C. J. BRYDGES, Esq.,

General Superintendent of Government Railways,  
Montreal.

## PRINCE EDWARD ISLAND RAILWAY.

## MECHANICAL DEPARTMENT,

CHARLOTTETOWN, 30th June, 1877.

SIR,—I beg to submit the report of my Department for the year ended 30th June, 1877. Appended are statements.

1. Statement of performance and cost of locomotive for the year.
2. Monthly statement of cost of locomotive power       “       “
3. Monthly abstract from locomotives returns       “       “
4. Monthly statement of car mileage       “       “
5. Statement showing number of locomotives and cars.

The work on the new rolling stock, and the fitting out of the new shops chargeable to capital were completed last January. Both were very much needed and we now feel the benefit.

The locomotives are in good order and only one will need a new fire box. The repairs will be lighter than formerly. No. 3 that was used as a stationary in the temporary shop got a new fire box and a general repair, and is in first-rate order for a light train.

While the expenses have diminished in locomotive repairs, they have increased in cars. Since the better shop accommodation has been afforded us and our engines became better able to handle heavy trains, it became necessary to strengthen the cars and increase their safety. The passenger coaches had to be stripped and stayed on the roof; drawbars and bolsters had to be strengthened—six have been double seated giving 25 per cent more sitting room,—nine have been furnished with larger wheels and trucks rebuilt.

Three second class and three postal have been changed,—changing the baggage room from the second class to the postal, so as to give more room for second class passengers.

The old box cars had to be renailed and painted. The frames under box and platform cars had to be refastened by through bolts to keep the ends from being pulled out, drawbar fastenings had to be made stronger and safety straps put on trucks to keep the body from being pulled off the trucks.

Two box cars have been rebuilt after the pattern of the new stock, and five platform cars. Twenty-five sets of trucks have been rebuilt for box and platform cars.

As the small wheels wear out, 33-inch ones will keep taking their place fitted for axes such as are used under the new stock which will take about three years time, and as we rebuild the bodies, they will be capable of carrying ten tons instead of at present eight.

25 box cars will need covering with sheet iron instead of canvas, wearing out.

5 engine ploughs and four large ploughs are in good order.

I have the honour to be, Sir,  
Your obedient Servant,

A. STRONACH,  
*Mechanical Superintendent.*

C. J. BRYDGES, Esq.,  
General Superintendent of Government Railways,  
Montreal.

# No. 1.—PRINCE EDWARD ISLAND RAILWAY.

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[1877]

Dr.

## CAPITAL ACCOUNT.

Cr.

1876.	cts.	\$ cts.	1876.	\$ cts.
June 30... To Cost of Road and Equipment to date .....	.....	3,196,562 80	June 30... By Dominion of Canada. ....	3,203,367 84
Add balance chargeable for outlays prior to opening of line.....	.....	6,805 24	1877.	
June 30... To Expenditure, year ended 30th June, 1877, classified as follows:—	.....		June 30... By Dominion of Canada .....	200,000 00
Fencing, including Snow protection. ....	65,140 46			
Roadway and Works .....	19,308 04			
Wharf Service .....	5,228 75			
Buildings, Stations and Water Service.....	31,419 45			
Machinery and Tools .....	7,806 78			
Rolling Stock.....	71,096 53			
Total.....	.....	200,000 00	Total .....	3,403,367 84

E. and O. E.

THOS. WILLIAMS,  
Accountant.

CHARLOTTETOWN, P.E.I.,  
30th June, 1877.

## No. 2.—PRINCE EDWARD ISLAND RAILWAY.

## DETAILED STATEMENT of Capital Expenditure for the Year ended 30th June, 1877.

Account.	Expenditure.
	\$ cts.
Fencing.....	\$43,210 15
Saw fencing.....	21,930 31
Breastwork at Charlottetown.....	65,110 46
Filling in yard at Charlottetown.....	521 28
Sidings in yard at Charlottetown.....	5,263 41
Sidings at Summerside.....	2,792 59
Semaphores at main stations.....	250 00
Lifting track, ballasting, &c.....	1,553 88
Wharf improvements, Summerside.....	8,926 88
Section-men's houses, grading, &c., at Royalty Junction.....	5,228 75
Machine shop, Charlottetown.....	850 46
Car shop, Charlottetown.....	9,588 27
Blacksmith shop, Charlottetown.....	2,681 50
Oil store and tanks, Charlottetown.....	1,101 64
Moving coal shed, and lengthening, Charlottetown.....	947 13
Tank and windmill, Charlottetown.....	1,614 12
Station house, waiting rooms, &c, Summerside.....	531 81
Altering shed into freight shed, &c., Summerside.....	4,258 38
Moving coal shed and lengthening same, Summerside.....	630 69
Station house, grading, &c., at county line.....	1,584 65
Station house, grading, &c., at Lot 40.....	2,420 30
Tanks (2).....	2,339 06
Cattle pens (11).....	1,320 30
Outfit of stations.....	895 04
Vault doors, steel-lined safe, &c., Cashier's office.....	128 00
New machinery and fitting up same, Charlottetown.....	528 10
Stationary engine for shops, Charlottetown.....	6,889 25
Four locomotives.....	917 53
Fitting up twenty eight (8-ton) flat cars with trucks, &c.....	33,200 00
Twenty two box freight cars.....	7,537 30
Thirty five (10-ton) flat cars.....	12,354 30
Four Conductors' vans.....	12,596 48
Two engine snow ploughs.....	4,000 17
	1,408 27
Total.....	200,000 00

THOS. WILLIAMS,  
Accountant.

CHARLOTTETOWN, P.E.I.,  
30th June, 1877.

## No. 3.—PRINCE EDWARD ISLAND RAILWAY.

REVENUE ACCOUNT, for Year ended 30th June, 1877.

Previous Year.	Expenditure.	Year ended 30th June, 1877.	Previous Year.	Receipts.	Year ended 30th June, 1877
\$	cts.	\$	cts.	\$	cts.
62,413 44	Locomotive Power, per Abstract 1.....	55,967 07	65,005 24	Passenger Traffic.....	60,357 41
23,027 54	do do 2.....	39,281 39	45,304 79	Freight Traffic.....	63,213 43
78,966 33	Maintenance Way and Works, Abst. 3.....	72,493 21	7,750 93	Mails and Sundries.....	7,094 08
23,188 88	Station Expenses do 4.....	22,757 03	118,060 96	Total Receipts.....	130,664 92
27,344 24	General Charges do 5.....	19,830 35	96,869 47	Balance .....	97,930 33
214,930 43	Total Ordinary Expenditure.....	210,329 08			
	<i>Renewals.</i>				
	Permanent Way, per Abstract 6.....	18,266 17			
214,930 43	Totals.....	228,595 25	214,930 43	Totals.....	228,595 25

E. and O. E.

THOMAS WILLIAMS,  
Accountant.

CHARLOTTETOWN, P.E.I.,  
30th June, 1877.

## No. 4.—PRINCE EDWARD ISLAND RAILWAY.

## LOCOMOTIVE POWER.—(Abstract 1.)

	Amount.
	\$ cts.
Mechanical Superintendent's salary, Clerks, office and travelling expenses .....	2,520 75
Wages of Drivers, Firemen and Cleaners .....	12,086 01
Fuel .....	11,641 26
Oil, tallow, waste and small stores .....	2,646 54
Repairs to engines, tenders and engine tools .....	17,540 87
Water, including pump and tank repairs .....	7,692 30
Miscellaneous .....	1,839 34
Total .....	\$55,967 07

E. and O. E.

THOMAS WILLIAMS,  
Accountant.

CHARLOTTETOWN, P.E.I.,  
30th June, 1877.

## No. 5.—PRINCE EDWARD ISLAND RAILWAY.

## CAR EXPENSES.—(Abstract 2)

	Amount.
	\$ cts.
Repairs to passenger cars .....	9,670 88
do postal express and baggage cars .....	1,121 30
do freight cars and vans .....	14,954 90
Wages of Conductors, Train Baggage Masters and Brakemen .....	8,330 48
Oil and waste for packing .....	1,221 05
Small stores and fuel .....	3,593 76
Miscellaneous .....	389 02
Total .....	\$39,281 39

E. and O. E.

THOMAS WILLIAMS,  
Accountant.

CHARLOTTETOWN, P.E.I.,  
30th June, 1877.

## No. 6.—PRINCE EDWARD ISLAND RAILWAY.

## MAINTENANCE OF WAY AND WORKS—(Abstract 3.)

	Amount.
	\$ cts.
Engineer's salary, Clerks, office and travelling expenses.. .. .	3,582 30
Wages in repairing roadway, fences and semaphores.....	38,008 50
Rails, chairs and spikes.....	6,544 51
Sleepers .. .. .	649 77
Timber and lumber for repairs to bridges, cattle guards and fences.....	5,068 78
Repairs to Wharves.....	528 01
do Buildings.....	7,141 74
do Snow ploughs, flangers and tools.....	3,351 40
Clearing ice and snow.....	7,617 23
Miscellaneous.....	
Total.....	\$72,493 24

E. and O. E.

THOS. WILLIAMS,  
*Accountant.*CHARLOTTETOWN, P.E.I.,  
30th June, 1877.

## No. 7.—PRINCE EDWARD ISLAND RAILWAY.

## STATION EXPENSES—(Abstract 4.)

	Amount.
	\$ cts.
Salaries and wages of Station Masters, Agents, Clerks, Telegraph Operators, Station Baggage Masters, Yardmasters, Switchmen, Watchmen and Laborers .....	15,985 02
Fuel, oil, light, stationery, tickets and other incidental expenses .....	6,759 06
Miscellaneous.....	12 95
Total .....	\$22,757 03

E. and O. E.

THOS. WILLIAMS,  
*Accountant.*CHARLOTTETOWN, P.E.I.,  
30th June, 1877.

## No. 8.—PRINCE EDWARD ISLAND RAILWAY.

## GENERAL CHARGES—(Abstract 5.)

	\$ cts.
Superintendent's and Train Despatcher's salaries, Clerks, office and travelling expenses.....	6,656 44
Accountant and Auditor's salary, Clerks, office and travelling expenses.....	5,107 58
Paymaster and Cashier's salary, Clerk, office and travelling expenses.....	2,222 73
General Express and Baggage Agent's salary, office and travelling expenses.....	444 16
Advertising ..	1,533 89
Damages to men, animals and goods.....	1,169 43
Telegraph expenses (not including pay to Operators).....	249 84
Miscellaneous.....	894 38
Storm damages, Souris Branch, 17th November, 1875.....	1,551 90
Total .....	\$19,830 35

E. and O. E.

THOS. WILLIAMS,  
*Accountant.*CHARLOTTETOWN, P.E.I.,  
30th June, 1877.

## No. 9.—PRINCE EDWARD ISLAND RAILWAY.

## RENEWALS OF PERMANENT WAY—(Abstract 6.)

	\$ cts.
Rails and Fastenings.....	\$18,268 17

E. and O. E.

THOS. WILLIAMS,  
*Accountant.*CHARLOTTETOWN, P.E.I.  
30th June, 1877.



## No. 10.—PRINCE EDWARD ISLAND RAILWAY.

## MONTHLY STATEMENT OF RECEIPTS.

Months.	Passengers.	Freight.	Mails and Sundries.	Total.
1876.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
July.....	8,351 85	4,051 23	592 25	12,995 33
August.....	6,651 05	3,396 73	651 31	10,699 13
September.....	6,691 55	3,519 30	915 51	11,126 36
October.....	4,790 97	6,106 65	528 94	11,426 56
November.....	5,936 19	10,960 16	502 27	17,398 62
December.....	4,494 91	6,729 63	680 09	11,904 60
1877.				
January.....	3,017 29	2,090 37	491 33	5,598 99
February.....	1,973 20	2,574 25	486 93	5,034 38
March.....	3,210 76	3,565 09	556 74	7,332 59
April.....	4,921 85	7,636 63	495 33	13,053 81
May.....	5,367 81	7,969 18	505 98	13,842 97
June.....	4,949 98	4,614 24	687 37	10,251 59
Totals, 1877.....	\$60,357 41	63,213 43	7 094 08	130,664 92

E. and O. E.

THOS. WILLIAMS,  
*Accountant.*CHARLOTTETOWN, P.E.I.,  
30th June, 1877.

## No. 11.—PRINCE EDWARD ISLAND RAILWAY.

## STATEMENT of General Store Account, year ended 30th June, 1877.

1876.		\$	cts.	\$	cts.
June 30.....	To Balance.....			31,984	55
1877.					
June 30.....	To Purchases during the year, including rails.....	103,315	99		
	Charges from other Departments.....	5,594	32		
	Pay rolls.....	3,475	65	112,385	96
1877.	Cr.			144,350	51
June 30.....	By Issues during the year.....			95,737	08
	Balance, 30th June, 1877. { Ordinary stores..... 30,339 92				
	{ Fuel..... 6,815 77				
	{ Rails and fastenings on hand..... 11,457 74				
				\$48,613	43

E. and O. E.

THOS. WILLIAMS,  
*Accountant.*CHARLOTTETOWN, P.E.I.,  
30th June, 1877.

## No. 12.—PRINCE EDWARD ISLAND RAILWAY.

GENERAL BALANCE.	CR.
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Dr	\$ cts.	\$ cts.	CR.
General stores .....	48,613 43	.....	Dominion Account.....
Cash .....	753 18	.....	Accident Insurance .....
Stations .....	112 84	.....	
Post Office Department.....	1,547 04	.....	
Suspense Account, .....	1,158 50	.....	
Total .....	\$52,184 99	Total .....	\$52,184 99

E. and O. E.

THOS. WILLIAMS,  
*Accountant.*CHARLOTTETOWN, P.E.I.,  
30th June, 1877.

# No. 13.—PRINCE EDWARD ISLAND RAILWAY.

COMPARATIVE Statement of Averages, for the Year ended 30th June, 1877.

DETAILS.	1877.	1876.
Train mileage .....	243,494	230,955
Car mileage .....	897,507	835,590
Receipts, per train mile..... Cents.	53 66	51 11
do per mile of railway.....\$.	666 66	602 36
Percentage of passenger earnings to gross receipts .....	46·19	55·06
do freight do do .....	48·38	38·37
do other do do .....	5·43	6·57
Expenses per train mile—		
Drivers', firemen's and cleaners' wages.....	4·96	4·82
Fuel.....	4·78	4·98
Oil, tallow, waste and small stores.....	1·09	1·20
Repairs to engines.....	7·20	11·29
Water and tank repairs.....	3·16	2·93
Miscellaneous.....	·76	·43
Total.....	21·95	25·65
Mechanical Superintendent's salary, office and travelling expenses.....	1·03	1·37
	22·98	27·02
Locomotive power.....	22·98	27·02
Car expenses .....	15·50	9·97
Maintenance way and works.....	29·77	34·19
Station expenses.. ..	9·35	10·04
General charges .....	8·14	11·84
Total (except renewals) .....	85·74	93·06
Renewals of permanent way and cars .....	8·14	.....
Total per train mile.....Cents.	93·88	93·06
Ordinary working expenses, per mile of railway .....	1,073 11	1,096 58
Renewals of permanent way and cars per mile of railway.....	93 19	.....
Total .....	\$1,166 30	\$1,096 58

E. and O. E.

THOS. WILLIAMS

Accountant.

CHARLOTTETOWN, P.E.I.,  
30th June, 1877.

## PRINCE EDWARD

## MECHANICAL

## No. 1.—STATEMENT of the performance and cost of

Engine No.	Builders.	In shop the whole of	Hours in steam.	Train mileage.				Miles run by Engines.			
				Passenger.	Freight and mixed.	Ballasting.	Piloting.	With train.	Light.	Shunting.	total.
1	Hinslet Engine Company, Leeds, England.	August & November .....	1,544	1,408	652	328	4,159	6,543	88	2,544	9,175
2		October, April, May & June .....	1,727	64	227	4,249	3,961	8,501	327	1,742	10,570
3		Year .....									
4		.....	2,499	8,409	3,324	928	98	12,813	46	3,541	16,400
5	Black, Haw- thorne & Co., Gateshead on Tyne.	Sept., October, Nov., March, April & June..	1,183	166	112		4,236	4,514	215	2,804	7,533
6		.....	1,865	4,364	2,793		2,707	9,864	384	1,617	11,765
7		July.....	1,701	81	856	3,789	422	5,147	586	4,987	10,720
8	Baldwin Loco- motive Works, Philadelphia.	March & June..	1,591	789	1,043	1,305	116	3,253	573	5,213	9,035
9		Jan'y & June .	1,201	446	554	2,905	1,669	5,574	373	1,087	7,034
10		May.....	2,920	322	787	260	69	1,438	274	13,431	15,133
11		.....	3,075	190	22,920	2,955	99	26,164	660	1,177	28,001
12	Canadian En- gine and Ma- chinery Co., Kingston, Ont.	.....	2,830	1,187	15,715	1,545	781	19,226	252	1,328	20,806
13		.....	2,763	301	25,810	98	296	26,505	35	1,039	27,579
14		August, Sept. & June.....	2,537	339	17,765	70	22	18,196	3	1,674	19,873
15		.....	2,722	568	10,221	7,893	1,388	20,070	502	1,576	22,148
16	.....	.....	2,753	336	17,339	22	1,789	19,486	121	442	20,049
17		.....	2,930	931	15,898	1,168	479	18,476	308	2,674	21,458
18		Nov. & Ap il..	2,182	441	18,969	502	343	15,255	216	2,268	17,739
18		Total.....	38,023	20,340	149,985	28,066	22,634	221,025	4,963	49,034	275,022

## ISLAND RAILWAY.

## DEPARTMENT.

Locomotives, for the year ending 30th Jan., 1877.

Total mileage of		Average of cars per mile run with train.	Cost of					Averages per 100 miles run by Engines.				
Cars.	Snow ploughs.		Enginemen's wages.	Fuel.	Oil, Tallow, Waste, &c.	Repairs.	Total.	Enginemen.	Fuel.	Oil, Tallow, &c.	Repairs.	Total.
			\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	cts.	cts.	cts.	cts.	cts.
6,836	4,766	2-86	528 29	326 88	89 78	888 85	1,833 80	5-76	3-56	98	9-68	19 98
26,131	4,716	5-75	598 23	342 72	93 14	913 77	1,947 86	5-66	3-24	88	8-64	18 42
						1,678 54	1,678 54					
41,688	.....	3-27	869 80	638 24	153 38	467 51	2,128 93	5-30	3-89	94	2 85	12 98
976	4,382	3-51	406 11	226 72	70 92	920 53	1,624 28	5-39	3 01	94	12-22	21-56
21,292	2,755	2 97	720 45	449 60	134 15	575 65	1,879 85	6-12	3-82	1 14	4-89	15-97
26,931	.....	5-70	550 17	427 20	116 78	671 82	1,765 97	5-13	3 98	1-09	6-27	16-47
16,644	.....	5 30	492 18	391 52	105 29	688 67	1,677 66	5-45	4-33	1-16	7-62	18-56
21,794	2,043	5-58	424 67	428 48	100 82	1,017 24	1,971 21	6-04	6-09	1-43	14-46	28-02
6,732	.....	4-91	866 72	440 64	126 41	456 51	1,890 28	5-73	2-91	83	3-02	12-49
167,339	419	6-42	1,190 21	1,696 48	334 58	1,408 30	4,629 57	4-25	6 06	1-19	5 03	16-53
102,741	.....	5-57	1,009 80	1,218 72	253 14	899 51	3,383 17	4-85	5-86	1-23	4-32	16-26
132,411	317	5-81	1,152 05	1,692 32	315 66	1,200 57	4,360 60	4-18	6-14	1-14	4-35	15-81
166,449	.....	5-85	937 86	1,003 36	176 92	1,599 98	3,718 2	4 72	5-05	89	0-05	18-71
135,416	.....	7-24	923 47	1,336 80	248 32	814 40	3,322 99	4-17	6-03	1-12	3-68	15-00
108,352	234	5-67	989 44	1,380 32	277 74	1,008 97	3,656 47	4-93	6 88	1-39	5 03	18-23
96,710	255	5 31	1,057 93	985 44	243 29	643 44	2,930 10	4-93	4-59	1-13	3-00	13-65
70,268	.....	4-71	781 37	823 84	225 24	1,797 64	3,628 09	4-41	4-64	1-27	10-13	20-45
1,096,708	19,887	5-54	13,498 75	13,809 28	3,067 56	17,651 90	48,027 49	4-91	5-02	1-11	6-42	17-46

\* Deduct Piloting from train mileage in making these averages.

A. STRONACH,  
Mechanical Superintendent.

**PRINCE EDWARD ISLAND RAILWAY.**  
**MECHANICAL DEPARTMENT.**

**No. 2.—MONTHLY statement of the cost of Locomotive Power for the Year ended 30th June, 1877.**

Months.	Miles run by Engines.	Cost of						AVERAGE PER MILE RUN.							
		Enginemen's Wages.	Fuel.	Oil, tallow, &c.	Repairs.	Water, including pump and tank repairs.	Miscellaneous, including expenses of office and engine houses.	Total.	Enginemen's Wages.	Fuel.	Oil, tallow, &c.	Repairs.	Water.	Miscellaneous.	Total.
		\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.
July .....	20,972	988 07	821 54	232 17	835 81	464 43	257 12	3,579 14	4.61	3.92	1.11	3.98	2.21	1 23	17.06
August.....	20,870	1,077 68	608 80	208 33	1,144 77	625 33	263 58	3,928 48	5 16	2 92	1.00	5.48	3 00	1 26	18.82
September.....	19,264	978 08	531 32	208 95	1,375 48	506 47	330 18	3,930 48	5.08	2.76	1.08	7.14	2.63	1.71	20.40
October .....	18,905	919 33	524 86	204 69	1,896 65	902 49	310 51	1,758 53	4.86	2.78	1.08	10.03	4.78	1.64	25.17
November.....	22,052	1,025 87	939 32	227 16	1,504 17	867 44	349 46	4,913 42	4.65	4.26	1.03	6.82	3.93	1.59	22.28
December.....	23,500	1,111 25	1,211 36	273 66	1,692 14	772 48	506 01	5,566 90	4.73	5.15	1.16	7.20	3.29	2.15	23.68
January .....	21,479	1,185 17	1,166 00	251 11	2,209 70	720 79	731 81	6,264 58	5.52	5.43	1 17	10.29	3.35	3.40	28.16
February .....	19,015	1,098 31	1,029 64	210 34	1,512 26	622 81	447 23	4,950 59	5.78	5.41	1.26	7.95	3 28	2.35	26.03
March .....	20,037	1,016 66	1,096 32	209 57	1,601 83	713 61	322 97	4,960 96	5.07	5.47	1.04	8.00	3.56	1.61	24.75
April.....	16,013	788 56	861 60	177 47	1,644 74	568 48	316 43	4,355 28	4.92	5.38	1.11	10.27	3.54	1.97	27.19
May.....	21,554	1,006 21	1,502 88	226 17	1,316 14	482 38	288 70	4,822 48	4.67	6.97	1.05	6.10	2.24	1.31	22.37
June.....	19,833	910 82	1,347 62	186 92	807 18	447 60	236 09	3,936 23	4.59	6.79	.94	4 07	2.26	1.19	19.84
Total.....	243,494	12,086 01	11,641 26	2,646 54	17,540 87	7,692 30	4,360 09	55,967 07	4.96	4.78	1.09	7.20	3.16	1 79	22.98

A. STRONACH,

No. 8.—MONTHLY ABSTRACT from Locomotive Returns for the Year ended 30th June, 1877.

[1877]

147

Months.	Hours in Steam.	Mileage of			Consumption.				Average Mileage.		Consumption per 100 miles of Engines.			
		Loco-motives.	Cars.	Snow Plows.	Bushels of Coal.	Pints of Oil.	Pounds of Tallow.	Pounds of Waste.	Miles Run to One Hour in Steam.	No. of Cars to one of Engine.	Bushels of Coal.	Pints of Oil.	Pounds of Tallow.	Pounds of Waste.
July .....	3,481	25,684	121,814	.....	7,817	1,528	763	465	7.37	4.74	30.43	5.94	2.97	1.82
August .....	3,794	27,274	125,441	.....	6,749	1,424	755	422	7.18	4.59	24.74	5.22	2.76	1.54
September .....	3,527	27,015	131,618	...	6,228	1,376	716	432	7.65	4.87	23.05	5.09	2.76	1.59
October .....	3,306	23,399	99,782	.....	5,541	1,164	640	438	7.07	4.26	23.67	4.97	2.73	1.87
November.....	3,322	23,947	107,319	.....	7,203	1,128	627	445	7.20	4.48	30.07	4.71	2.61	1.85
December.....	3,260	23,713	74,531	4,574	7,869	1,312	710	430	7.27	3.14	33.18	5.33	2.99	1.81
January .....	3,239	21,479	48,201	6,180	7,239	1,168	611	394	6.63	2.24	33.70	5.43	2.98	1.83
February .....	3,010	19,015	48,297	5,490	6,301	1,116	554	322	6.31	2.53	33.13	5.86	2.91	1.69
March .....	2,870	20,037	58,683	3,243	6,730	912	510	344	6.98	2.92	33.38	4.	2.54	1.71
April.....	2,196	16,218	75,119	.....	5,340	796	449	303	7.38	4.63	32.92	4.90	2.76	1.86
May .....	3,052	23,916	105,789	.....	9,803	1,152	427	388	7.83	4.42	40.98	4.8.	1.78	1.63
June .....	2,966	23,325	103,104	.....	9,488	952	578	401	7.86	4.42	40.67	4.68	2.47	1.71
Total ..	38,023	275,022	1,099,708	19,897	86,308	14,028	7,400	4,787	7.23	4.00	31.38	5.10	2.69	1.74

A. STRONACH,  
Mechanical Superintendent.



## No. 4.—PRINCE EDWARD ISLAND RAILWAY.

## MECHANICAL DEPARTMENT.

## MONTHLY STATEMENT of Car Mileage for the Year ending 30th June, 187

Months.	First Class.	Second Class.	Postal, Baggage and Express.	Box, Stock and Hay.	Platform and Coal.	Total
July .....	20,876	10,855	13,029	27,619	49,605	121,884
August .....	18,626	6,536	17,814	22,483	59,982	125,441
September .....	20,368	9,049	17,806	24,066	60,429	131,618
October .....	15,368	8,032	13,093	37,248	26,041	99,782
November .....	15,582	7,821	12,504	56,522	14,890	107,319
December .....	13,624	6,500	10,524	39,268	4,615	74,531
January .....	9,991	6,244	6,965	17,943	7,058	48,201
February .....	9,341	6,115	5,982	16,746	10,113	48,297
March .....	12,072	7,195	7,472	17,725	14,229	58,693
April .....	12,641	9,326	7,775	35,443	9,934	75,119
May .....	17,963	11,247	12,754	36,204	27,621	105,789
June .....	15,890	17,853	6,129	29,175	34,057	103,104
Totals .....	182,242	106,573	131,847	360,472	318,574	1,099,708
Less Ballasting .....	117	11,577	6,232	967	183,308	202,201
Balance .....	182,125	94,996	125,615	359,505	135,266	897,506

A. STRONACH,  
Mechanical Superintendent.

## No. 5.—PRINCE EDWARD ISLAND RAILWAY.

## MECHANICAL DEPARTMENT.

STATEMENT showing the number of Locomotives and various Class of Cars on hand, 1st July, 1876 and 1877.

Particulars.	Locomotives.	Classification.					
		1st Class.	2nd Class.	Postal, Baggage and Express.	Box and Stock.	Platform.	Vans.
On hand, July 1st, 1876 .....	14	14	9	5	128	72	3
Increase during year .....	4	.....	.....	.....	22	28	1
Total, 1st July, 1877 .....	18	14	9	5	150	100	4

A. STRONACH,  
*Mechanical Superintendent.*

COMPARATIVE STATEMENT of Maintenance of Way Expenditure for years 1875-76, 1876-77.

Account.	1875-76. Amounts.	1876-77. Amounts.
Track .....	\$40,002 72	\$36,282 79
Ballasting .....	51 20	331 94
Rails .....	796 43	1,996 20
Fish plates .....	892 60	941 63
Bolts and nuts .....	215 88	162 16
Chairs .....	121 95	92 94
Spikes .....	1,801 53	890 10
Sleepers .....	.....	649 77
Frogs .....	303 16	1,208 41
Switches .....	390 77	923 64
Signals .....	207 24	169 64
Bridges .....	712 01	2,168 06
Culverts and cattle guards .....	311 07	1,192 03
Buildings and platforms .....	3,343 61	7,141 74
Wharf at Cascumpee .....	.....	56 47
do Summerside .....	240 65	202 01
do Charlottetown .....	12 79	52 03
do Georgetown .....	.....	218 50
Fencing .....	1,024 53	967 36
Hand-cars and trollies .....	1,557 54	463 96
Tools, and repairs of .....	1,800 89	1,568 16
Station-yards and road approaches .....	112 56	1,315 73
Snow-plows and flangers .....	1,669 56	1,319 28
Removing snow and ice .....	19,089 27	7,617 23
Track scales .....	7 29	14 75
Cranes .....	2 43	.....
Chuck blocks .....	111 45	51 70
Engineer's office and expenses .....	4,060 95	3,582 30
Switch locks .....	116 35	49 35
Semaphores .....	.....	67 49
Turntables .....	.....	776 47
Foggles .....	.....	19 50
	\$78,956 33	\$72,493 24

## APPENDIX No. 21.

## INTERCOLONIAL RAILWAY.

## RAILWAY DEPARTMENT,

MONTREAL, 16th November, 1877.

SIR,—I now beg to report upon the working of the Intercolonial Railway for the year ended 30th June, 1877.

The section between St. Flavie and Campbellton, 105 miles, was opened on the 1st July, 1876, then completing the entire line.

The mileage worked during the year was, therefore, as follows:—

River du Loup to Moncton .....	374 miles.
St. John to Halifax.....	276 “
Pictou Branch.....	52 “
Point du Chêne Branch.....	11 “
Total.....	713 “

In addition, the Windsor Branch of 32 miles which was leased, was maintained by the Department, and the following local branches were also maintained and worked, viz:—

The Rimouski Branch.  
Dorchester “  
Sackville “

The average mileage worked during the previous year was 512 miles, or an increase during the year ended 30th June, 1877, of 201 miles.

I now append the following Statements:—

- No. 1. General capital account.
2. Capital account under Act 1867.
3. Revenue account.
4. Abstract of Locomotive power.
5. “ Car expenses.
6. “ Maintenance of way and works.
7. “ Station expenses.
8. “ General charges.
9. Statement of general stores account.
10. Comparative statement of averages.
11. General balance sheet.
12. Statement of renewals of permanent way.

I also enclose copies of reports by the Engineer and the Mechanical Superintendent.

## CAPITAL ACCOUNT.

The total expenditure to 30th June, 1877, for the entire line has amounted to the sum of \$35,682,249.11.

There has been no capital expenditure during the year upon the o.d lines in New Brunswick and Nova Scotia.

There has been expended during the year on the Intercolonial proper, between River du Loup and Truro, the sum of \$965,175.77. This has been for the completion of the ballasting, sidings, station buildings, work-shops, machinery and rolling stock. These expenditures, except on account of rolling stock, and for law costs in connection with the petitions of right, and the settlement of some items not yet brought into the books, are nearly all completed.

There has been expended on account of the extension into Halifax, the sum of \$14,433.56, and on account of the deep water terminus at the St. John, the sum of \$8,819.33.

The outlay on the Halifax extension will be completed during the present fiscal year, but the St. John terminus will not be finished until the close of 1879.

During last year, all works of improvement on the old lines, usually and heretofore charged to capital, have been defrayed by revenue, increasing thereby the cost of working. It is intended to continue this plan, except for any additions to the rolling stock.

#### REVENUE ACCOUNT.

The gross earnings for the year amounted to the sum of \$1,154,445.35, against the sum of \$848,861.46 in the previous year, but as the mileage and circumstances were so completely altered, no comparison can be made.

The portion opened between St. Flavie and Campbellton runs for the greatest part of its length through what at present is a wilderness, and produces practically no traffic in itself.

On the parts of the line previously opened the trade has been greatly depressed. The staple industries of coal, timber and shipbuilding have shewn no signs of improvement, and the traffic in those items has consequently been injuriously affected.

The general trade of the country has also, for the same reasons, been small and languid. In fact, what has been the case everywhere else throughout the Dominion as well as in the United States, has tended greatly to diminish the traffic upon the Intercolonial Railway.

The through business between Quebec, Montreal and the west, and the Lower Provinces, along the line of the Intercolonial Railway, has largely exceeded expectations and is steadily increasing.

This trade, it is now clear, is to be a steadily growing one, not only in provisions, but in general merchandise which used to be so largely purchased in the United States. This trade is now, by the aid of the railway, being largely diverted to Canadian markets.

The carriage of fish has developed already considerable results, and promises to be a largely increasing one every year. Special arrangements are being made to foster this trade to the greatest possible extent. The trade in salmon is already large, and what are called "freezers" are being erected by private enterprise at many stations on the line, which enables fresh fish to be placed in all the cities of Canada and the United States, weekly, throughout the year.

The large iron works at Londonderry, in Nova Scotia, have been brought into operation, and are giving a large and rapidly increasing traffic to the railway. Pig, and merchant bar iron, as well as car wheels, are now being shipped over the Railway in considerable quantities to all parts of Canada. Londonderry, which at the opening of the line was completely in the woods, is now, with the exception of the *termini*, the largest receiving and shipping station on the Intercolonial Railway. With this, and other new sources of business, and with reviving prosperity in the coal, lumber and shipbuilding interests, the increase of traffic on the line will be very considerable.

#### ORDINARY WORKING EXPENSES.

These have amounted to the sum of \$1,461,673.55, but for reasons already stated, no comparison with the previous year can be fairly made.

I have already stated that all the outlay heretofore and usually charged to capital on the old lines, has been included in working expenses for the past year. These various items include ballasting, to bring the old line up to the standard of the new one, costing about \$30,000; taking down and rebuilding decayed masonry, principally in Nova Scotia, and replacing worn-out bridges, about \$12,000; new and enlarged station buildings, about \$8,000; additional sidings, about \$3,000; and various other items, making a total of upwards of \$65,000.

In the previous year a sum of upwards of \$56,000 was expended for similar purposes, and charged to capital.

A large sum has also been expended in completing the renovation of the rolling stock belonging to the old lines. This rolling stock was in very bad condition, and much of it had to be entirely rebuilt.

During the last year, ten first-class cars, besides many others of various kinds, have been entirely rebuilt, and now the rolling stock of the line is in first-rate order, and will be maintained economically. This process of reconstruction has been going on for several years, and is now nearly completed. All the outlay on this account has been charged to working expenses, and, for last year, amounted to upwards of \$40,000.

Revenue has therefore been charged during the year ended 30th June, 1877, with upwards of \$100,000, to bring the permanent way and rolling stock of the old lines into a condition equal to the new parts of the Intercolonial proper, and to provide increased station and siding accommodation for the traffic.

Deducting then this exceptional outlay, the cost of working the Intercolonial Railway for the first year of its complete operation, has exceeded the receipts by about \$200,000.

The mileage of engines for the year was 2,176,201, and the mileage of cars was 15,973,420.

The cost per train mile run was 82 cents which is exceedingly low.

The rate per train mile in 1874, before the Northern Line was opened, was \$1.02, shewing a reduction of 20 per cent. The weight of the trains is now also considerably higher.

In the working expenses is included a sum of \$13,530.65 for hire of cars used in interchange of traffic with other lines. The rapid growth of the through business found the railway with an insufficient stock of freight cars; 700 box cars were ordered, and are now nearly completed, but whilst they were under construction, mileage had to be paid for the use of foreign cars. The stock on the line is now sufficient, and the mileage account with other lines will in future be nearly balanced.

In addition to thoroughly renovating and reconstructing the stock of cars, the locomotive stock is being also carefully attended to. The repairs of the engines have been heavy during the last year, and the whole stock is now in good condition.

Two engines were purchased last year to supply the necessary depreciation, and charged to working expenses. It is intended for the present to procure three per cent. of the stock of engines yearly at the cost of revenue, to provide for all future depreciation.

During the season of navigation on the St. Lawrence, the ocean mails are delivered to, and received from, the mail steamers at Rimouski.

This has effected a large saving of time, both with the west and with the Lower Provinces.

Mails for Europe are now in summer made up weekly at Toronto, Halifax and St. John, on Friday night, and are collected and put on board the steamer at Rimouski on Saturday evening.

The delivery of the mails from England has been very greatly expedited in the Lower Provinces by this plan.

Passengers are also availing themselves of this route, upwards of 400 having landed and embarked at Rimouski during the present season.

The cost of working the mail tender at Rimouski, and of the special trains run in connection with it, are included in the working expenses of the railway.

During last winter the mails were landed and delivered at Halifax. On the

arrival of the steamers there, special trains were at once despatched with the mails, and reached Montreal in advance of the arrival of the steamers at Portland. By this arrangement the mail service was greatly expedited to the west, and was of great benefit to the Lower Provinces.

These mail trains were run with great regularity and at a considerable rate of speed throughout the winter. The quickest run was made between Halifax and River du Loup in 15½ hours, the distance being 561 miles, or equal to 36 miles an hour.

The whole line is now well provided with snow sheds and fences, and no effort will be spared to make the mail service in winter successful. The line between River du Loup and Quebec is, unfortunately, not in nearly so satisfactory a physical condition as the Intercolonial, and no safeguards have been provided against heavy snow storms.

#### RENEWALS.

The renewal of the old iron rails in New Brunswick and Nova Scotia has been steadily proceeded with. The sum of \$200,000 has been charged during the year ended 30th June, 1877, on account of this. This is about the average amount which has been charged for several years back on this account. A similar sum will be charged annually until the whole work is completed and paid for, which will probably be by the 30th June, 1879. The entire line will then be laid with steel rails between River du Loup and Halifax and St. John. All the old and defective masonry will be replaced, and all the old bridging converted into permanent structures. There is still a good deal to do in the last two items. The ballasting of the old parts of the line, the cost of which is being charged to working expenses, will also be completed and made equal to the Intercolonial proper. The intention is to make the whole line first class in every respect, fit for running trains at a high rate of speed, and to be worked economically.

This process of reconstruction has been steadily progressing since 1871, and has been applied both to the line and rolling stock. All the outlay has been charged and will continue to be charged against revenue, and, in the aggregate, will amount to about one and three quarter millions of dollars.

The whole line and rolling stock are now in a fairly satisfactory condition, and will be entirely so when the ballasting is completely finished.

#### STORES.

The stock of stores on the 30th June, 1877, was as follows:—

General stores, including fuel.....	\$ 118,370 02
Old rails.....	190,704 68
Old materials for sale.....	39,963 08
<b>Total.....</b>	<b>349,037 78</b>

The general stores are about as low as they can be upon a line of upwards of 700 miles.

The item of old rails will hereafter diminish, but not very rapidly as long as the market for old iron remains so low.

Old materials are not being pressed for sale at present low prices, but this item will probably diminish in future.

Coal has been contracted for at the following prices for the present year:—

At Stellarton.....	\$1.65 per gross ton.
At Spring Hill Junction.....	1.90 " "

The price of all stores has been greatly lessened during the last three years, partly by lower general prices, and partly by asking for tenders for the different articles required.

The following list will show the difference in prices paid now and in 1874 and the percentage of difference, taking the present prices as the basis of the calculation:—

	Cost in 1876-7.		Cost in 1873-4.		Reduction.
	\$	cts.	\$	cts.	
Cast-iron car wheels.....	11	75 each.	18	00 each.	53 per cent.
Steel-tyred wheels.....	37	50 "	52	50 "	40 "
Cast-iron castings.....	02.28	per lb.	04.25	per lb.	86 "
Bar iron.....	01.90	"	04.31	"	126 "
Coal.....	1	77 per ton.	3	73 per ton.	110 "
Cut spikes.....	0	2.65 per lb.	05.20	per ton.	96 "
Oak lumber.....	39	50 per M.	58	50 per M.	48 "
White Oak.....	29	00 "	60	00 "	106 "
Spring Steel.....	0	06 per lb.	0	18 per lb.	200 "
Steel springs for cars...	33	25 "	0	55 "	66 "
Waste.....	06	"	0	13 "	116 "

In the cost of printing and stationery, the reduction in the prices paid, amounted to a very much larger percentage on the average of the articles used.

The average cost of working the railway in operation for the year ended 30th June, 1874, was \$3,839.38 per mile of railway.

For the year ended 30th June, 1877, the average was \$2,327.27 per mile, a reduction of \$1,512.11 per mile.

In the last year was included the cost of running winter mail trains between Halifax and River du Loup, the mail service at Rimouski in summer, the large outlay for ballasting and works of construction heretofore charged to capital, and the expenditure for rebuilding so much of the old rolling stock.

The steamer "Northern Light," which has been greatly strengthened and improved during the summer, will, after the close of the ordinary navigation, between Pictou and Georgetown, and it is hoped will materially assist the increase of traffic between the Intercolonial and Prince Edward Island Railways.

The traffic of the line is now steadily increasing, and there is every reason to hope that within three or four years, when the renewals are fully completed, it will be possible to make the gross earnings cover the entire cost of working the railway.

I have the honor to be, Sir,  
Your obedient servant,

C. J. BRYDGES,  
*General Superintendent of Government Railways.*

F. BRAUN, Esq., Secretary  
Department of Public Works,  
Ottawa.

CAPITAL ACCOUNT.				CR.	
DR.		\$ cts.	\$ cts.	1876.	\$ cts.
1876.					
June 30.....	To Cost of Road and Equipment.....		13,548,916 07	June 30.....	By Dominion of Canada.....
	Less amounts charged in previous years to Consolidated Fund, and for difference between Nova Scotia and Dominion currency prior to June, 1870.....		767,207 29	1877.	
	Outlay on the Halifax Extension.....	214,433 56	12,781,708 78	June 30.....	By Dominion of Canada.....
	do Deep Water Terminus at St. John.....	98,819 33			
	do Snow Sheds .....	1,042 14	314,295 03		By Dominion of Canada.....
	Expenditure on Intercolonial Railway, under Act of 1867, between Rivière du Loup and Truro .....		22,586,245 30		
			\$35,682,249 11		\$35,682,249 11

E. &amp; O. E.

THOS. FOOT,  
*Accountant.*

MONCTON, N.B., 30th June, 1877.



## No. 2—INTERCOLONIAL RAIL

DR.

BALANCE SHEET at the 30th

SERVICES.	Amount.	Amount.	Amount.	Exp 30th 1877
	\$ cts.	\$ cts.	\$ cts.	
Buildings.....				678
Engineering and Survey.....				1,273
Legal expenses, Land Survey and Valuation				72
Management.....				151
Printing, Advertising and Stationery.....				27
Right of way.....				268
Rolling Stock.....			(a)	1,564
(a) Postal and Baggage and Mail Cars.....	3,349 95			
Conductors' Vans.....	8,241 52			4,036
Snow Ploughs and Flangers.....	11,591 88			
Rolling Stock expenses (renumbering Cars).....	53 17			
		23,236 52		
Box Freight Cars.....		293,315 58	316,552 10	
Works and Permanent Way, June 30th, 1876 and 1877, as per respective Balance Sheets.....		15,734,949 89	16,197,397 31	
Contracts completed by the Government :— 1875-76.....		1876-77.....		
(b) No. 3. F. N. Berlinguet & Co.....	\$97,112 97	97,112 97		
6. " ".....	63,104 60	63,104 60		
9. J. B. Bertrand & Co.....	25,091 89	25,091 89		
15. " ".....	95,090 32	94,904 19		
12. Summer & Somers.....	105,141 95	105,141 95		
13. W. E. Macdonald & Co.....	113,925 65	113,977 79		
16. King & Gough.....	24,255 21	24,224 50		
17. S. P. Tuck.....	11,344 59	16,982 87		
22. C. Cummings & Co.....	168,143 71	168,143 71		
23. Sutherland, Grant & Co.....	95,135 34	95,000 51		
	\$798,346 23	803,484 98		
		798,346 23	803,484 98	(b)
Advances in 1875-76 and 1876-77.....		16,533,296 12	17,000,882 29	
(c) No. 18. R. H. McGreevy.....	55,996 49	58,517 28		
	17,710 84	17,710 84		
	73,707 33	76,228 12		
		73,707 33	76,228 12	c)
		16,607,003 45	17,077,110 41	
		944,923 01	944,923 01	
		17,551,926 46	18,022,033 42	
				17,551
Carried forward.....				21,590



## No. 2—INTERCOLONIAL RAILWAY

DR.

BALANCE SHEET at the 30th June 1877

SERVICES.	Amount.	Amount.	Amount.	Expenses at 30th June 1876
	\$ cts.	\$ cts.	\$ cts.	\$
<i>Brought forward.....</i>				21,590,71
Telegraph Line.....				16,80
Mail Tender, "Rimouski".....				16,80
Petitions of Rights expenses.....				
H. D. Finlay, Paymaster, balance in hands at 30th June, 1876.....				2,20
Right of way, Province of Quebec, balance in hands of the Accountant (being the aggregate amount of three official Arbitrators' awards on land claims) awaiting legal advice as to the disposal of the money.....				
LESS—The Paymaster's balance in hands at 30th June, 1876.....				21,626,54
				21,626,54

INTERCOLONIAL RAILWAY OFFICE,  
OTTAWA, 30th June, 1877.

INSTRUCTION ACCOUNT.—*Continued.*

7. Per General Ledger.

Cr.

Depended in Years and 1877.	Total Expended at 30th June, 1877.	CREDITS.	Amount.	Total.
\$ cts.	\$ cts.			\$ cts.
\$33,404 57	22,544,161 43	<i>Brought forward</i> .....		22,591,774 08
	16,830 00			
2,365 72	19,169 72			
10,985 93	10,985 93			
627 00	627 00			
\$5,383 22	22,591,774 08			
2,207 45				
\$1175 77	22,591,774 08			22,591,774 08

THOS. C. DUPLESSIS,  
*Accountant.*

**No. 3.—INTERCOLONIAL RAILWAY.**  
**REVENUE ACCOUNT for Year ending 30th June, 1877.**

Expenditure.	Year ending 30th June, 1877.	Receipts.	Year ending 30th June, 1877.
	\$ cts.		\$ cts.
Locomotive power	442,895 26	Passenger traffic.....	480,368 15
Car expenses	325,270 45	Freight do .....	607,584 99
Maintenance, way and works	384,280 84	Mails and sundries.....	86,512 21
Station expenses	157,475 86	Balance	1,154,445 35
General charges	138,220 50	{ Receipts against	307,228 20
Car mileage	13,630 65	{ Working expenses. }	1,461,673 55
Total ordinary expenditure .....	1,461,673 55		

E. and O. E.

**THOMAS FOOT,**  
*Clerk & Accountant.*

**MONCTON, N.B.,**  
 30th June, 1877.

## No. 4.—INTERCOLONIAL RAILWAY.

## LOCOMOTIVE POWER.—(Abstract No. 1.)

	\$ cts.
Mechanical Superintendent's salary, Clerks' office and travelling expenses.....	6,795 39
Wages of Drivers, Firemen and Cleaners.....	97,825 88
Fuel .....	142,510 13
Oil, tallow, waste and small stores.....	19,487 00
Repairs to engines and tenders and engine tools.....	136,940 81
Water, including pump and tank repairs.....	25,238 31
Miscellaneous.....	14,197 74
	<b>\$442,895 26</b>

E. and O. E.

THOS. FOOT,  
*Accountant.*MONCTON, N.B.,  
30th June, 1877.

## No. 5.—INTERCOLONIAL RAILWAY.

## CAR EXPENSES.—(Abstract No. 2.)

	\$ cts.
Repairs to passenger cars.....	97,622 84
do Postal, express and baggage cars.....	11,956 72
do Freight cars and vans.....	80,504 89
Wages of Conductors, Train Baggage Masters and Brakesmen.....	86,827 67
Oil and waste for packing.....	5,211 89
Small stores and fuel.....	30,623 95
Miscellaneous.....	9,520 49
	<b>\$325,270 45</b>

E. and O. E.

THOS. FOOT.  
*Accountant.*MONCTON, N.B.,  
30th June, 1877.

**No. 6.—INTERCOLONIAL RAILWAY.**  
**MAINTENANCE OF WAY AND WORKS.—(Abstract No. 3).**

	\$	cts.
Engineer's salary, Clerks' office and travelling expenses.....	9,333	45
Wages in repairing roadway, fences and semaphores.....	249,131	50
Rails, chairs and spikes.....	8,285	86
Sleepers.....	17,916	01
Timber and lumber for repairs to bridges, cattle guards and fences .....	13,384	12
Repairs to wharves.....	10,139	08
Repairs to buildings .....	28,500	49
Repairs to snow ploughs, flangers and tools.....	17,537	22
Clearing ice and snow.....	28,771	88
Miscellaneous .....	1,281	33
	<b>\$384,280</b>	<b>84</b>

E. and O. E.

**THOS. FOOT,**  
*Accountant.*

**MONCTON, N.B.,**  
**30th June, 1877.**

**No. 7.—INTERCOLONIAL RAILWAY.**  
**STATION EXPENSES.—(Abstract No. 4).**

	\$	cts.
Salaries and wages of Station Masters, Agents, Clerks, Telegraph Operators, Station Baggage Masters, Yardmasters, Switchmen, Watchmen and Laborers .....	116,578	23
Fuel, oil, light, stationery, tickets, and other incidental expenses.....	40,897	62
Miscellaneous.....		
	<b>\$157,475</b>	<b>85</b>

E. and O. E.

**THOS. FOOT,**  
*Accountant.*

**MONCTON, N.B.,**  
**30th June, 1877.**

**No. 8.—INTERCOLONIAL RAILWAY.**  
**GENERAL CHARGES.—(Abstract No. 5.)**

	\$	cts.
General Superintendents' and Superintendent's salaries, his Assistants, Train Despatchers, Clerks, &c., and Passenger and Baggage Agent, and office and travelling expenses.	40,292	73
Accounting Department, salaries of the Accountant, Auditor, Paymasters and Cashiers, Clerks' office and travelling expenses .....	28,113	29
Damages to men, animals and goods.....	8,856	06
Ferry service .....	25,266	72
Telegraph expenses (not including pay to Operators).....	4,247	72
Miscellaneous, printing, advertising, &c.....	20,931	89
Agency expenses.....	10,512	59
	<b>\$138,220</b>	<b>50</b>

E. and O. E.

**THOS. FOOT,**  
*Accountant.*

**MONCTON, N.B.,**  
**30th June, 1877.**

## No. 9.—INTERCOLONIAL RAILWAY.

## STATEMENT of General Stores Account, Year ending 30th June, 1877.

1876.	DR.	\$	cts.	\$	cts.
June 30....	To Balance .....			155,788	46
1877.					
June 30....	Purchases during year.....	1,107,226	02		
	Charges from other Departments .....	331,624	03		
	Pay Rolls .....	11,207	09	1,450,057	14
	CR.			1,605,845	60
June 30....	By Issues during year .....	1,171,802	41		
	Material, &c. sold :—				
	Old Rails, 3,824 tons, 16 cwt. 2 qrs. 17 lbs ...	75,382	65		
	“ Cast Scrap, 599,637 lbs .....	3,839	94		
	“ Cast Iron Chairs, 359,605 lbs .....	2,148	43		
	“ Scrap, Axles 860 lbs .....	12	90		
	“ Steel, 121,834 lbs. ....	1,311	99		
	“ Spikes, 58,800 lbs .....	957	00		
	“ Scrap Wheels, 3,100 lbs.....	27	90		
	“ Wrought Scrap, 380 lbs .....	5	70		
	“ Frogs, 1.....	30	00		
	New Spikes, 150 lbs.....	4	50		
	“ Frogs, 3.....	285	00	85,603	41
				1,256,807	82
	Balance stores on hand :—				
	Ordinary Stores.....	118,370	62		
	Old Rails.....	190,704	68		
	Old Material .....	39,963	08	349,037	78

E. and O. E.

THOS. FOOT,  
Accountant.MONCTON, N. B.,  
30th June, 1877.



## No. 10.—INTERCOLONIAL RAILWAY.

## COMPARATIVE STATEMENT OF AVERAGES, Year ending 30th June, 1877.

Details.	1877.	1876.
Mileage of railway open .....	714	462
Engine mileage .....	2,176,201	1,162,856
Train do .....	1,773,621	947,082
Car do .....	16,973,420	7,352,271
Receipts per engine mile .....	Ots. 53-05	Ots. 72-99
do per mile of railway .....	\$1,616 87	\$1,837 36
Percentage of passenger earnings to gross receipts .....	Ots. 39 88	Ots. 41-51
do freight do .....	52 62	52-84
do other do .....	7-50	5-65
Expenses per engine mile—		
Drivers, Firemen and Cleaners' wages .....	4-50	5-29
Fuel .....	6-55	5-26
Oil, tallow, waste and small stores .....	0-89	1-00
Repairs to engines .....	6-29	7-09
Water and tank repairs .....	1-16	1-16
Miscellaneous .....	0 65	0-80
Total .....	20-04	20-60
Mechanical Superintendent's salary, office and travelling expenses .....	0-31	0-43
	20-35	21-03
Locomotive power .....	20 35	21-03
Car expenses .....	14-95	13-11
Maintenance, way and works .....	17-66	23-83
Station expenses .....	7 24	9-17
Car mileage .....	0-62	
General charges .....	6-35	6-22
Total (except renewals) .....	67 17	73-36
Renewals .....	9-19	20-62
Total per engine mile .....	76 36	93-98
Ordinary working expenses per mile of railway .....	\$2,047 16	\$1,846 50
Renewals per mile of railway .....	280 11	518 81
Total .....	2,327 27	2,365 31

E. and O. E.

THOS. FOOT,  
Accountant.MONCTON, N.B.,  
30th June, 1877.

# No. 11.—INTERCOLONIAL RAILWAY.

## GENERAL BALANCE.

	\$	cts.	\$	cts.	\$	cts.
Cash.....	118,370	02	10,858	01	By Dominion Account .....	940,008 97
General Stores:—	190,704	68			Accident Insurance .....	5,195 12
Ordinary Stores.....	39,963	08			Grand Trunk Railway.....	1,395 11
Old Rails .....					Unpaid Account.....	3,382 18
Old Material .....			349,037	78		
Stations.....			24,972	24		
Post Office Department.....			69,726	16		
Windsor and Annapolis Railway:—						
Old Traffic Account .....	867	35				
Punchard, Clarke & Co. ....	7,652	34				
Windsor Branch (one-third earnings)	1,456	18				
Chatham Branch Railway.....			9,965	87		
Elgin Branch Railway.....			1,395	24		
Prince Edward Island Railway .....			573	13		
Spring Hill and Parrsboro' Railway .....			3,832	20		
New Brunswick and Canada Railway .....			1,036	60		
C. H. and Indianapolis Railway .....			34	15		
Vermont Central .....			20	39		
A. E. Killam (Albion Railway).....			3	82		
Renewals Suspense Account.....			3,385	94		
Bills Receivable.....			343,591	68		
Suspense Account.....			16,178	36		
Vale Coal Company .....			49,161	21		
Intercolonial Coal Company .....			14,182	57		
Spring Hill Coal Company.....			830	83		
Acadia Coal Company.....			3,407	64		
Drummond Coal Company.....			7,936	83		
Steel Company of Canada .....			1,805	18		
Nova Scotia Forge Company.....			204	35		
Dominion Telegraph Company.....			1,617	04		
Pictou Custom House .....			2,151	86		
Coldbrook Rolling Mills Company .....			233	00		
Intercolonial Express Company .....			1,992	68		
Individual Accounts.....			1,722	20		
			30,315	42		
			949,981	38		949,981 38

E. and O. E.

THOS. FOOT, Accountant.

MONCTON, N.B., 30th June, 1877.

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No. 12.—INTERCOLONIAL RAILWAY.

RENEWALS.—(Abstract No. 6).

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	\$	cts.
Rails and Fastenings, Fencing, &c .....	200,000	00

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E. and O. E.

THOS. FOOT,  
*Accountant.*

MONCTON, N.B.,  
30th June, 1877.

## INTERCOLONIAL RAILWAY.

ENGINEER'S OFFICE,

MONCTON, N. B., 16th July, 1877.

SIR,—I have the honor to submit the following Report upon the operations of the Engineering Department for the fiscal year ended 30th June, 1877.

The total length of iron rail on the Main Line and the Pictou Branch, on the 1st July 1876, was 133 miles, or 11,970 tons, and there were also 12 miles or 1,188 tons of old, H iron rails on the track on the Windsor Branch which had become unfit for traffic, the balance of the latter branch (20 miles) was relaid in the previous year.

The estimated cost of substituting steel for the iron rail on the Main Line and the Pictou Branch, and of replacing that on the Windsor Branch with new T iron rail, amounted to \$600,000 of which \$200,000 are annually being charged out, thus requiring three years to close the renewal account.

126,242 sleepers were renewed on the Main Line and Branches.

A total length of 15,768 rods of new fence was erected throughout the line, at a cost of \$12,694.94.

There was also an outlay of \$11,468.51 for repairs of fences on the Main Line and Branches.

An expenditure of \$34,478.71 was incurred in ballasting various portions of the Main Line between Halifax and St. John and its branches, to supply original deficiencies, and to bring the whole up to the standard of a first class railway.

Work on the extension into Halifax had progressed sufficiently to admit of the line being opened for freight traffic on the 2nd October, 1876, and on the 16th of the same month passenger trains were run to a temporary station erected adjacent to the new passenger buildings, now nearly ready for occupation, the contract for which expires on the 1st September next. The passenger buildings are of brick, and consist of a main building with a frontage of 113 feet and a depth of 50 feet, together with shed 400 feet long and 80 feet broad and having its roof covered with corrugated galvanized iron, supported on 24 iron trusses placed 16 feet apart.

The main building has two clear stories and a Mansard roof, the sides of the latter being covered with slate, and the top asphalted gravel roofing.

There is also a basement under one half of the main building, in which are placed the furnace and boiler for heating the various offices and waiting rooms with steam.

The gas pipes are laid throughout the building and the fixtures will also shortly be in place.

There will be three tracks inside the shed and two platforms, each 400 feet long and 18 and 20 feet wide, respectively.

The baggage room is 80 feet long and 15 feet wide, it has three large doors connecting with the passenger shed, which admit of baggage being transferred to and from the cars with despatch.

On the east side of the shed there will be eight doors 6½ feet wide each, for the exit of the travelling public, on the arrival of the trains. The baggage room will be supplied with two depot scales, sunk in the floor, of a weighing capacity of two tons each.

An iron railing is in course of erection on North and Lockman Streets, and on the stone wall which divides the passenger from the freight building; the latter being on a lower level to suit the grade of Water Street upon which it fronts. The latter

building is of brick and was erected last year, its length is 500 feet, one half being 40 feet wide and the other half 30 feet, and in it are four depot scales of a weighing capacity of six tons each.

A double track coal trestle 232 feet long has been erected, and has been divided into five compartments for the convenience of the various Coal Companies shipping coal to Halifax for local use.

The land acquired for the extension is being enclosed with a picket fence eight feet high, except that portion on North Street terminus, where the iron railing alluded to is in course of erection.

At Richmond the following frame buildings have been erected in connection with the extension into Halifax for traffic purposes :

A freight shed 260 feet long, one half being 38 feet and the other 25 feet wide.

A car shed 200 × 45 feet for housing and repairing passenger cars.

A warehouse 480 × 34 feet for the reception of bonded goods arriving by the ocean steamers and destined for the various Provinces.

A shed 96 × 25 feet for cattle, sheep, &c., arriving by train. This shed is open at the sides, but is roofed over and is divided into four compartments, each being connected by a gate which admits of the whole building being thrown into one when necessary.

A crib 200 feet long and 40 feet broad has been built against the seaward side of the deep water wharf to prevent the tendency of a few cribs to move on the shelving bottom, and its construction has answered every expectation. One of the cribs in the centre of the wharf has been replaced by a new work to carry a track leading from the station grounds to the warehouse above alluded to.

This wharf is 750 feet long and 114 feet wide, with a depth of water on the west or shore side, ranging from 10 to 36 feet, and from 32 to 52 feet on the east or seaward side.

Heavy repairs have also been made to the old wharf at this station, as it has become unsafe to sustain the weight of trains.

Three cranes have been erected on the deep water wharf for the transfer of heavy freight.

All the tracks in Richmond yard have been re-arranged and extensive additions have been made to the siding accommodation.

So soon as the tracks now in hand at North Street terminus are completed, which will shortly be the case, there will be 42 in the two yards, representing a total length of 36,941 lineal feet, or 25,391 feet of standing room, equivalent to about five miles.

During the year past distant semaphore signals have been erected at eighteen telegraph stations, and it is intended to supply these safety signals to all regular stations.

The Stewiacke Branch was completed and was opened for traffic on the 16th October, 1876. Its length is 5,110 feet, and it diverges from the Main Line 2,236 feet south of Stewiacke Station. This Branch connects with the Stewiacke River at its juncture with the Shubenacadie River, about 22 miles from the flourishing village of Maitland.

Both the above are tidal rivers, and the latter flows into the Bay of Fundy at Maitland, with which place a large business is done over the railway.

A wharf 150 feet long and 50 feet wide, and a shed 40 × 120 feet have been provided to facilitate the handling of freight. Ordinary tides rise 10 feet at this wharf, and at high water there is a depth of 12 feet.

An iron lattice girder bridge of 150 feet span supported on stone abutments is being built over the Nine Mile River at Elensdale, to replace a wooden structure about 600 feet long.

The existing bridge spans the above river and the interval on its north bank, and has nineteen spans of 30 feet each, which have become unfit for traffic.

An embankment has been partially formed across the interval and will be finished in a few weeks. The new bridge is being erected without detention to trains, and in the course of a month will be ready for use.

The long wooden bridge over Robinson's meadow at Brookville Station, consisting of 20 spans of 30 feet each, received extensive and substantial repairs.

The old bents consisted of spruce timber which had become unsound, and pitch pine was substituted in its place.

Jardine's Bridge, a wooden structure near St. John, and having ten spans of 10 feet each has been entirely renewed except the foundation piles.

The piles have been cut off at the water line, and new bents, flooring, &c., have been erected thereon.

The renewal of the bents, stringers, &c., of Misquash Bridge has been commenced within the last few days. This bridge is about three miles west of Sussex, and has four spans of 15 feet each and one span of 26 feet.

Slight repairs have been made on several other wooden bridges between Halifax and St. John.

The masonry of 40 small bridges, culverts and cattle guards on the line between Halifax and St. John received heavy repairs, some being almost rebuilt, and the construction of two new culverts was required to provide for the passage of water during seasons of freshet.

At Moncton the following works have been carried out:

The sidings have been increased in number and length to suit the requirements of the traffic.

A freight shed 200 feet  $\times$  30 feet has been erected on the site of the old building, and a track scale with a weighing capacity of 50 tons has been provided.

A cattle yard has been built adjacent to the new freight shed.

A building for the storage of ice for train service has been erected, and a reservoir, with a capacity of  $1\frac{1}{2}$  million gallons of water, has been built to provide for engine and fire purposes.

A brick sewer 2,310 feet long, has been built through the station grounds to drain the yard and the various buildings erected therein.

Owing to the absence of sufficient office accommodation, an addition of 17 feet has been made to the general offices, and fire-proof vaults have been provided for the storage of books, plans, and documents of various kinds, no provision having been previously made for their safe keeping.

Dwellings have been erected for the Superintendent and Engineer on the railway property adjacent to the station, for which a rent is paid by the occupants.

In Moncton yard there are 18 dwellings belonging to the Railway Department, for which an annual rental of \$1,359 is received.

On the 1st July, 1876, the remaining link of 105 miles between Campbellton and St. Flavie was opened for traffic, making the distance between the termini at Halifax and Rivière du Loup 561 miles. Adding to this the line from Moncton to St. John, 89 miles, and the Pictou, Shediac and Windsor Branches, of the respective lengths of 52.11 and 32 miles, the aggregate length of road which has been maintained by this Department during the past years is 745 miles, in addition to 82 $\frac{1}{2}$  miles of track in the 440 sidings laid throughout the line, and the short branches at Stewiacke, Dorchester, Sackville, Moncton, Newcastle and Rimouski.

The whole road is at present divided into seven districts, each being under the supervision of a trackmaster, and these districts are again divided into sections of an average length of 5 $\frac{1}{2}$  miles, each in charge of a foreman and two men whose duty it is to inspect the track daily and to make the necessary repairs.

The outlay incurred in keeping the track clear of snow and ice during the winter months was \$28,771.88, for a total length of 713 miles.

The following statement will show the number and length of snow sheds and the length of snow fence erected throughout the line, to the 30th June last :—

Districts.	Number of Sheds.	Length of Snow Sheds in feet.	Length of Snow Fence in feet.
Between Truro and Pictou .....			11,847
Truro and Painsec .....	12	16,470	36,454
St. John and Point du Chêne .....			14,817
Moncton and Bartibogue .....	1	1,197	7,364
Bartibogue and Campbellton .....	7	7,480	76,288
Campbellton and St. Octave .....	36	29,276	2,817
St. Octave and Rivière du Loup .....	7	9,012	85,475
Total .....	63	63,435	235,062

In addition to the foregoing, 11,000 feet of snow fence and 2,000 feet of snow shed between St. Flavie and Causapsal stations, are in course of erection, there being 18 cuttings between these points which require protection.

The following work was performed in connection with the water supply :—

Elmsdale being an important watering station, and as the old tank had become unfit for further use, a new one of 6,250 gallons capacity has been furnished, and is filled by a steam pump brought from Glenfalloch temporary tank, which ensures a bountiful supply on all occasions and prevents detention to trains.

Repairs to the tank at Riversdale were made, and the reservoir at Pictou Landing was enlarged to provide the necessary supply of water for engine purposes. The tanks at these two stations are fed by gravitation.

At Folly Lake a new steam pump was erected and an additional tank provided, the joint capacity of the two being 9,193 gallons.

At Amherst, 3,000 feet of four-inch iron pipe was substituted for the 1½ inch pipe originally laid, as the latter had become so reduced in size from corrosion, &c., as to be unable to vent a sufficient supply.

A second tank was built adjoining the old one, their joint capacity being 12,000 gallons.

At Greenville, the water supply is limited, and there being but three tanks between Folly Lake and Amherst, excluding the tanks at the latter station, it became necessary to provide a supply at two other points to overcome the detention which sometimes occurred to freight trains during the winter months.

Thompson and Spring Hill were selected as the most important places, and a tank filled by hand pump has therefore been erected at these stations with a capacity of 5,300 gallons in the one case, and 3,530 gallons in the other.

The tank at Hampton being old, burst from the pressure of water in it and has been replaced with a new one, the capacity being 5,300 gallons. This is a gravitation supply.

A temporary tank filled by hand pump and holding 1,000 gallons was erected one mile north of Bartibogue, the supply at Red Pine station having failed.

As there are generally 18 locomotives stalled daily at Campbellton during the winter months, and as the water supply there is not more than sufficient for the machine shops, a tank with a capacity of 5,300 gallons, was erected six miles north, and a temporary tank was also erected two miles south, to insure a proper supply for the larger number of engines leaving that station.

The water is conveyed by gravitation to those tanks, through wooden boxes

supported upon timber trestles. At the latter point it will be necessary to erect a larger tank, and to lay down about 600 feet of four-inch iron pipe before the winter.

Owing to the insufficiency of water at Campbellton for engine purposes, a large outlay will be required to provide a gravitation supply.

The water in St. Flavie well having failed, a tank house and a tank were erected about a mile south of the station, where there is now a good supply. This tank is filled by hand pump, and holds 4,175 gallons.

Much difficulty was experienced during the winter months in maintaining a continuous supply at St. Octave and St. Fabien as the wells are filled from surface water, which was quickly converted into ice by the intense frost.

The trackmen at these points had frequently to be out nearly the whole night cutting open the trench to keep up the necessary supply for engine use.

There are altogether 80 watering stations on the main line and branches, of which ten are fed by steam pump, twenty-eight by hand pump, seven by windmills, and thirty-five by gravitation.

Improvements were made to the buildings and station yards at the following points:—

At Windsor Junction the passenger station was re-arranged, and increased accommodation was provided.

At Shubenacadie the freight platform and cattle pen were renewed, and the freight shed received necessary repairs.

A hay shed, in size 15×40 feet, open at the sides, and a platform 10×80 feet, were built for the convenience of shippers at this station, and two sidings were extended and connected with the main line by a three-throw switch, which added 871 feet to the standing room in the yard.

The two sidings at the south end of Stewiacke yard were extended 200 feet each.

At Brookfield the freight shed was repaired, and the passenger platform was renewed.

The waiting rooms and offices at Truro were repaired and painted, and a siding 715 feet long was laid for use during the Provincial Exhibition held there in October 1876.

The frame engine shed at Stellarton was repaired and strengthened, and at Pictou the Agent's office was enlarged, and necessary repairs were made.

At Londonderry one of the sidings was lengthened 1,334 feet, and the grading for additional siding accommodation at Spring Hill was commenced.

A siding 1,020 feet long was laid at Mattinson's Mill near Thompson Station, and 665 feet to McMann's Mill,  $3\frac{1}{2}$  miles north of Memramcook, and one 520 feet long to Jones' Mill, near Painsec, the owners of the property having graded the road bed and furnished the sleepers.

At Meadow Brook the platform was renewed, and two at Sussex were lengthened; the freight platform at the latter station was renewed, and the roof of the freight shed was re-shingled and painted.

At Moncton the waiting rooms of the passenger station were repaired and painted and during the present summer the exterior of the building will require painting. The old passenger building of this station, converted about four years ago into two dwellings and occupied by employees of the mechanical department, was accidentally destroyed by fire in April last.

Necessary repairs were made to the offices and dwelling apartments of the Agents at Salisbury and Anagance, and the roof of Hampton Station building was reshingled and painted.

The site of the flag station at Torryburn having been found inconvenient it was changed and a new shed and platform were provided a few hundred feet south.

At St. John necessary repairs were made to the station agents' apartments; an extension of twenty feet was made to the baggage room, and the old car shed at the south end of the yard was converted into a freight shed, a floor and platform being provided and the roof reshingled and painted.

The piles which supported the large freight shed at this station having settled



on the west side, thereby springing some of the arched ribs, it became necessary to block up the defective part, and put in timbers where needed.

The platform on the outside of this building was relaid with four-inch plank its whole length, there being a heavy traffic over it.

The old store house near the passenger station has been converted into two dwellings and rented to employees.

A platform 35×8 feet was laid down at the west end of the yard for the convenience of parties sending milk to the city.

At Weldford the siding has been extended 156 feet to afford necessary accommodation for train crossings.

A siding having a length of 343 feet, and platform 12 feet wide and 100 feet long, were provided at Acadieville 2 miles south of Carleton.

For the convenience of the residents of Derby, a siding 278 feet long has been laid at the north end of S. W. Miramichi bridge, and two platforms have been provided on opposite sides of the track, one 120×12 feet for passengers, and the other 150×15 feet for freight.

At the Newcastle Wharf and at Bathurst Station, a coal trestle and siding have been supplied for the storage of coal required for the local use, and at the four following stations, coal sheds have been built to contain a large supply for engine purposes.

These sheds are approached by a trestle work upon which the hopper cars are run, and their contents are deposited into the shed readily, and at a minimum expense.

Station.	Size of Shed in feet.	Length of Trestle work in feet.
Miramichi.....	162 x 25	715
Campbellton.....	136 x 24	900
St. Flavie.....	117 x 25	824
Rivière du Loup.....	110 x 30	477

The wood shed at Bathurst was converted into a freight shed and those at Bartibogue, Jacquet River, Dalhousie, and at six stations in the Metapedia Valley, into coal sheds.

Freight and passenger platforms were built at Poplar Grove, 6½ miles north of Bathurst; at Nashe's Creek, 5 miles north of Jacquet River; at Eel River, 5½ miles north of Charlo; at Christopher's Brook, 6 miles north of Campbellton, and at Sandy Bay Road, 3½ miles north of Sayabec.

Small buildings of brick for the storage of oil were erected at Campbellton, St. Flavie and Rivière du Loup.

Two dwellings houses were erected in the Metapedia Valley for the use of the trackmen.

Slight repairs have been made to a number of station buildings and platforms throughout the line, in addition to those herein mentioned.

Before the close of another year it will be necessary to rebuild the masonry of Enfield Bridge on the Eastern Division, owing to the defective state in which it now is.

This bridge has three iron girder spans of 49 feet each, and the track is 25 feet above the bed of the stream.

The new bridge could be built of one span of 100 feet, thus dispensing with two stone piers.

The wooden bridge over Barney's Brook, 3 miles north of Elmsdale, of three spans of 30 feet each and 40 feet high, will also require attention as the masonry is in a very defective condition.

The replacing of the long timber bridge over Hall's Creek near Moncton, with an iron girder of 50 feet span, supported upon abutments of masonry, should be undertaken before the close of the present fiscal year; one of the girders from the Enfield Bridge will answer for this work.

The timber bridge over Beaver Brook, near Windsor Junction, consisting of four spans of 20 feet each, should be replaced with iron plate girders, as well as the bridges at a road crossing near Torryburn and at Davidson's Cove, near Rothesay, they having one span of 27 feet and 33 feet each, respectively.

The foregoing are the most important bridges which require attention during the present year; there are also several culverts between Halifax and Truro upon which extensive repairs are necessary, a large outlay being required to place the masonry in proper condition and equal to that between Moncton and Rivière du Loup.

The drainage of the road bed has received careful attention during the past year, and the track throughout the whole line is in good running order.

I have the honor to be, Sir,  
Your obedient servant,

ALEX. MACNAB,  
*Engineer.*

C. J. BRYDGES, Esq.  
General Superintendent Government Railways.  
Montreal.

## INTERCOLONIAL RAILWAY.

MECHANICAL SUPERINTENDENT'S OFFICE,  
MONCTON, N.B., 24th September, 1877.

SIR,—I beg to submit a report of the operations of the Mechanical Department for the year ending June 30th, 1877.

Appended hereto will be found the following statements:—

- A. Shewing the number of locomotives, and the various classes of cars.
- B. Statement of cars.
- C. Abstract of locomotive returns.
- D. Statement of locomotive and car mileage, with average number of cars hauled per mile.
- E. Comparative statement of the cost of locomotive power for each month.
- F. General statement of the expenses of the Mechanical Department.

Ten first class, three second class, one stock, nine platform and three coal cars were rebuilt and charged to repairs, besides two new cattle cars were added to the stock from Revenue.

Two engines were purchased and charged to Revenue.

In addition to the work of keeping the car stock in good condition, there have been built in the shops, twelve conductor's vans, four wing and seven ordinary snow ploughs, three flangers, five postal cars one hundred and twenty-five box cars. Fifteen of the latter were constructed as refrigerators, under Wicke's patent, for carrying fresh fish, &c.

One engine was converted from broad to narrow guage for St. Martin's and Upham Railway, and one was converted for A. E. Killam.

The rolling stock is generally in good condition.

I am, Sir,  
Your obedient servant,

H. A. WHITNEY.  
*Mechanical Superintendent.*

C. J. BRYDGES, Esq.,  
General Superintendent Government Railways,  
Montreal.

**A.—STATEMENT showing the Number of Locomotives, and of the various Classes of Cars, July 1st, 1876, and June 30th, 1877.**

Particulars.	Locomotives.	The various Classes of Cars.										
		1st Class Passenger.	2nd Class Passenger.	Postal and Smoking.	Express and Baggage.	Conductors' Vans.	Box Freight.	Stock.	Hay.	Platform.	Coal Hoppers.	Snow Plows.
On hand, July 1st, 1876 .....	100	46	34	16	13	4	401	44	34	1028	900	19
Purchased to maintain the Stock, and paid for out of Running Expenses .....	2	....	....	....	....	....	....	....	....	....	....	....
Built at Moncton and charged to Car Expenses.....	....	....	....	....	....	....	....	2	....	....	....	....
Built at Moncton as increased Stock, and charged to Capital .....	....	....	....	1	....	12	115	....	....	....	....	11
Built by Jas. Copen at cost of Capital .....	....	....	....	....	....	....	118	....	....	....	....	....
Built by the Ontario Car Works at cost of Capital .....	....	....	....	....	....	....	100	....	....	....	....	....
Total .....	102	46	34	17	13	16	734	46	34	1028	900	30

**B.—STATEMENT of Cars, June 30th, 1877.**

	Total.	Condemned to be Rebuilt.	Being Rebuilt.	Repairing.	Serviceable.
First-class .....	46	...	1	...	45
Second-class .....	34	...	...	3	31
Postal and Smoking .....	17	...	...	...	17
Baggage and Express .....	13	...	...	1	12
Conductors' Vans .....	16	1	...	...	15
Box Freight.....	734	4	2	22	706
Stock.....	46	...	...	5	41
Hay .....	34	1	...	...	33
Platform .....	1,028	...	7	34	981
Hoppers .....	900	3	...	38	859
<b>Grand Total.....</b>	<b>2,868</b>	<b>9</b>	<b>10</b>	<b>103</b>	<b>2,746</b>

C.—ABSTRACT OF LOCOMOTIVE RETURNS, JUNE 30TH, 1877.

[1877]

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Months.	Hours in steam.	Mileages.			Consumption.				Averages.			Consumption per 100 miles.			
		Locomotives.	Cars.	Snow Ploughs.	Tons of Coal.	Oil, pints.	Tallow, lbs.	Waste, lbs.	Miles to 1 hour steam.	Cars to 1 mile run.	Snow Ploughs to 1 mile run.	Coal, lbs.	Oil, pints.	Tallow, lbs.	Waste, lbs.
July .....	15,502	153,271	1,015,083	.....	3,696	10,138	7,186	3,284	9.88	6.62	.....	54.01	6.61	4.68	2.14
August .....	17,149	167,249	1,190,385	.....	4,263	10,135	7,740	3,424	9.75	7.11	.....	57.09	6.05	4.62	2.04
September.. ..	17,617	170,019	1,272,464	.....	3,852	9,528	7,634	3,377	9.65	7.48	.....	56.75	5.60	4.49	1.98
October .....	19,872	184,463	1,498,863	.....	4,601	9,124	7,252	3,460	9.28	8.12	.....	55.87	4.94	3.93	1.82
November .....	20,027	184,467	1,492,067	.....	4,501	8,752	6,698	3,310	9.41	7.91	.....	53.49	4.64	3.56	1.75
December .....	21,355	194,263	1,257,331	5,214	5,283	8,563	6,274	2,950	9.09	6.44	0.24	60.91	4.40	3.23	1.51
January .....	23,467	193,449	1,127,962	24,397	5,918	10,330	6,940	2,914	8.24	5.93	0.10	68.52	5.34	3.68	1.50
February .....	21,162	178,008	1,230,399	15,367	4,725	8,586	6,207	2,760	8.41	6.91	0.72	59.45	4.82	3.48	1.55
March .....	21,221	188,239	1,349,060	9,558	4,819	8,472	6,127	3,012	8.87	7.16	0.45	57.34	4.50	3.25	1.60
April .....	19,080	172,720	1,364,366	257	4,180	7,173	5,298	2,594	9.05	7.89	.....	54.34	4.15	3.06	1.50
May .....	20,110	193,719	1,606,818	.....	4,393	10,294	7,151	3,703	9.63	8.29	.....	50.79	5.31	3.69	1.91
June .....	19,324	192,334	1,568,622	.....	4,364	9,426	6,633	3,496	9.95	8.15	.....	50.82	4.90	3.44	1.81
	235,866	2,176,201	15,973,420	40,793	54,605	110,521	81,142	38,287	9.18	7.31	0.02	56.20	5.12	3.70	1.76

## D.—STATEMENT of Locomotive and Car Mileage, June 30th, 1877.

Months.	Locomotive Mileage.		Car Mileage.							Average Number of Cars per mile.	
	Passenger.	Freight.	1st Class.	2nd Class.	Express, Postal and Baggage.	Box, Stock and Hay.	Platform and eight-wheel Coal.	Four wheels, two rated as one.	Total.	Passenger.	Freight.
July .....	70,072	59,771	162,833	114,767	87,360	389,384	203,683	57,076	1,015,083	5.20	10.87
August.....	71,743	67,245	172,754	128,071	90,360	468,924	245,529	84,747	1,190,385	5.45	11.88
September .....	68,584	72,140	157,070	123,221	93,672	539,111	231,031	128,359	1,272,404	5.69	12.45
October .....	67,195	84,278	154,684	128,195	95,225	695,449	252,979	172,331	1,498,863	5.63	13.30
November .. .....	65,864	89,776	137,129	127,634	97,209	637,844	333,133	159,118	1,492,067	5.49	12.58
December ....	69,993	85,318	138,974	130,911	86,789	537,084	280,769	103,804	1,257,331	5.22	10.45
January .....	64,415	85,946	115,787	114,095	83,071	452,297	192,203	170,509	1,127,962	4.86	9.48
February .....	55,913	87,180	104,502	104,527	79,735	481,778	202,397	257,460	1,230,399	5.16	10.80
March .....	62,972	91,565	121,199	128,864	86,299	528,042	287,786	226,880	1,349,060	5.37	11.05
April.....	60,003	81,427	113,209	127,605	84,456	683,995	216,981	138,120	1,364,368	5.40	12.76
May .....	63,020	94,576	140,540	142,906	85,207	791,015	273,639	173,511	1,606,818	5.80	13.09
June .....	63,761	90,864	149,421	148,671	85,590	775,865	277,139	131,936	1,568,622	6.01	13.40
Totals .. .....	783,535	990,086	1,668,102	1,528,457	1,054,973	6,980,788	2,937,249	1,803,851	15,973,420	5.68	11.84

12.—COMPARATIVE STATEMENT of the cost of Locomotive Power for each month from 1st July, 1876, to 30th June, 1877.

Months.	Miles run by Engines.	Cost per 100 miles run by Engines.														
		Drivers and Firemen's Wages.	Fuel.	Oil, Tallow, Waste and Small Stores.	Repairs to Engines, Tenders and Tools.	Water, including Tank repairs.	Miscellaneous, including Office and Engine Houses.	Total.	Drivers' Wages.	Fuel.	Oil, Tallow, Waste and Small Wares.	Repairs.	Water.	Miscellaneous.	Total.	
		\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	
	July.....	6,418 11	6,497 05	1,491 85	7,993 24	50 98	918 64	23,369 87	4 19	4 24	0 97	5 22	0 03	0 60	15 25	
	August.....	6,249 49	8,122 30	1,376 61	5,545 96	292 63	1,241 93	22,828 92	3 74	4 80	0 84	3 31	0 16	0 74	13 65	
	September.....	6,266 88	7,216 87	1,375 67	3,915 98	301 68	1,201 10	20,278 16	3 68	4 24	0 82	2 31	0 17	0 67	11 89	
	October.....	7,776 44	16,172 87	1,470 90	6,607 27	1,436 52	1,382 45	34,846 47	4 22	8 77	0 79	3 58	0 79	0 75	18 90	
	November.....	8,573 10	11,529 95	1,584 58	6,095 63	1,566 73	1,367 13	30,717 12	4 54	6 10	0 83	3 30	0 82	0 71	16 20	
	December.....	9,405 12	15,001 47	1,871 50	10,662 91	3,391 17	2,193 69	42,525 86	4 84	7 72	0 96	5 48	1 76	1 12	21 88	
	January.....	9,631 90	17,001 43	2,052 42	16,697 18	3,394 02	2,486 44	51,263 39	4 97	8 78	1 06	8 64	1 75	1 28	26 48	
	February.....	9,401 04	12,897 96	1,795 65	14,821 15	6,116 86	2,077 58	47,110 24	5 29	7 24	1 01	8 32	3 44	1 16	26 46	
	March.....	8,734 17	13,431 58	1,733 05	16,457 75	2,809 12	1,967 97	45,133 61	4 64	7 13	0 92	8 74	1 49	1 05	23 97	
	April.....	8,201 93	11,563 86	1,378 22	17,332 10	2,502 14	1,869 66	42,847 91	4 75	6 70	0 80	10 03	1 45	1 08	24 81	
	May.....	9,105 03	12,216 61	1,901 37	17,131 28	1,948 98	1,473 30	43,776 57	4 70	6 31	0 98	8 85	1 00	0 76	22 60	
	June.....	8,062 67	10,858 18	1,455 18	13,680 34	1,427 50	2,713 24	38,197 11	4 19	5 61	0 75	7 12	0 74	1 42	19 86	
Totals.....	2,176,201	97,825 88	142,510 13	19,487 00	136,940 81	25,238 31	20,893 13	442,895 26	4 49	6 55	0 89	6 20	1 17	0 96	20 35	

**F.—GENERAL STATEMENT of Expenses of the Mechanical Department, Year  
30th June, 1877.**

The miles run by Trains were.....				
"	"	Engines .....		15
"	"	Cars .....		
"	"	Snow Ploughs .....		
The cost of Locomotive power was.....				445
"	"	Repairs to cars .....		192
"	"	Oil and Waste for packing.....		5
"	"	Repairs to Passenger Cars.....		97
"	"	Postal, Express and Baggage .....		14
"	"	Freight Cars and Vans .....		8
The cost of Locomotive power per 100 miles run by Trains was.....				
"	"	"	Engines.....	
"	"	"	Cars.....	
The cost of repairs to cars per 100 miles run by Trains was.....				
"	"	"	Engines.....	
"	"	"	Cars.....	
The cost of oil and waste for packing per 100 miles run by Trains was.....				
"	"	"	Engines.....	
"	"	"	Cars.....	
Repairs to passenger cars per 100 miles run by them.....				
"	"	postal, express and baggage .....		
"	"	freight cars and vans .....		

## APPENDIX No. 22.

## PACIFIC RAILWAY.

## CANADIAN PACIFIC RAILWAY.

## OFFICE OF THE ENGINEER IN CHIEF.

OTTAWA, January 4, 1878.

SIR,—I have the honour to report on the progress made in surveying operations in connection with the construction to the 31st December, 1877.

## SURVEYS IN THE EASTERN OR WOODLAND REGION.

In the season of 1876, a trial location survey was made from the proposed Eastern terminus, near Lac Amable du Fond, about 23 miles south-east of Lake Nipissing, to Cantin's Bay on French River, and from this line, explorations were made of the route extending northwestward, on a course as direct as practicable to a point on the north shore of Lake Superior near the mouth of the River Pic.

These explorations were not completed; and portions of the trial location above mentioned were not satisfactory, as the low gradients that had been expected were not obtained.

During the past season, four surveying parties were employed in completing the exploratory surveys, and improving the location of the line of the previous year. Plans and profiles are in progress, and the following is an outline of the results of the past season's work.

*Location of the line from South River to Cantin's Bay on French River.*

This line commences at a point on South River about 3 miles from its mouth on Lake Nipissing, and 22 miles north-west of Lac Amable du Fond, where the survey of the previous year commenced. It follows down the left bank of the river to the head of Lake Nipissing: thence it takes a course nearly west to the 20th mile, from which its course is south-west to the 35th mile, where it joins the survey of the previous year, and then follows that line on a course nearly west to the head of Cantin's Bay, 49½ miles from the point of beginning. If extended to the foot of the bay, its length will be 55½ miles.

This bay—a sheet of water about 5 miles in length, and averaging nearly a mile in breadth—lies at the confluence of the Pickerel and south branch of French River, about 20 miles from the mouth of the latter on the Georgian Bay. Its altitude varies from 4 to 6 feet higher than that of the latter; so that to extend the navigation of the Georgian Bay to Cantin's Bay, a lock would be required to mount the rapids near the mouth of the river, the rest of the distance being still to be run; it is, in fact, a long, narrow lake.

The country traversed is generally rocky, and broken up with numerous lakes and small streams running in narrow valleys or ravines.

The altitude at the starting point on South River is estimated 678 feet above sea level, being 530 feet lower than that of Lac Amable du Fond, and the highest point on the line is 813 feet, being 407 feet lower than the summit altitude of the line of the previous year. But still the proposed maximum gradient of 1 in 200, or 5 feet per mile, has not been obtained. The gradients can, however, be kept down to a maximum of 1 in 150, or 35.20 feet per mile, rising eastward, without involving heavy works. Of this gradient of 1 in 150 there are ten separate lengths,



making a total of about 8 miles. In descending to Cantin's Bay, however, is 1 in 133, or 39.60 feet per mile; but it is expected that this can be right slight deviation, and lengthening of the line. Of the maximum of 1 in 133 westward, there are seven short lengths, making an aggregate of  $5\frac{1}{2}$  miles.

The works will be generally lighter than on the corresponding line surveyed in 1876. The heaviest will be in rock cuttings, running from 100 to 300 feet of maximum depth, and 300 to 800 feet in length, with embankments of larger dimensions. There will be about 12 miles on which work of this kind will occur, and 14 miles on which there will be rock cuttings varying from 100 to 300 feet of maximum depth, and averaging about 500 feet in length. The balance of the line will be of moderately light work.

The principal bridging will be as follows:—

*Beatty's Creek*.—Ravine 250 feet wide with a maximum depth of 40 feet.

*Commando Creek*.—Breadth of valley 620 feet, maximum depth 62 feet, breadth of stream 120 feet.

*Outlet of Lake Mahmasagamising*.—One span of 100 feet.

*Pickereel River*.—One span of 150 feet.

*Pickereel River branch*.—Breadth of ravine 220 feet, maximum depth 40 feet, breadth of stream 40 feet.

In addition to these, there will probably be some bridging required where materials for embankments cannot be obtained in the vicinity.

#### *Surveys and Explorations from French River to Lake Superior*

Exploratory surveys have been made of two lines extending between different points on the line last described, and meeting at a common point in the valley of the Wahnapiatpee.

The northern, and most direct, line diverges at the 19th mile of the main line and takes a general course a little to the north of west. Continuing the line to the South River (Lake Nipissing) it crosses the main branch of French River at the 26th mile, at the Chaudière Falls, where the trough of the river is 200 feet deep, and the breadth of the stream 50 feet. Near the 29th mile, it crosses the north branch of this river, and follows down its left bank to the 34th mile, where the line crosses the river, which at this point is 200 feet wide, and 10 feet deep.

At the 39th mile, it crosses another arm of French River, 200 feet wide, and follows a chain of narrow valleys which are separated by low rocky ridges. At the 61st mile, it crosses Lake Maskinonge, 1700 feet wide and 18 feet deep, which can however be reduced by drainage. The line reaches the Wahnapiatpee at the 72nd mile.

There is very little variation in the altitude of the country throughout, and the gradients are generally easy. The works would be variable, alternately runs in the valleys or across intervening ridges. There would be an aggregate of about 11 miles on which rock cuttings varying from 5 to 100 feet of maximum depth, but in short lengths, would occur. On the rest of the line the works would be medium or moderate.

The southern line leaves the main line at the 48th mile near Cantin's Bay, and within half a mile it crosses the Pickereel River, which is 200 feet wide and 5 feet deep. It then follows the north shore of Cantin's Bay, crosses the main branch of French River at the Horse Rapids, where the river is 200 feet wide. Near the 55th mile, it crosses another branch of this river, and at the 57th mile it crosses the north branch, where the channel is 200 feet wide.

Thence, the line takes a generally north-westward course, following the narrow valleys and lakes. It crosses the south end of Lac de l'Isle at the 61st mile, and following another chain of valleys and flats, separated by rocky ridges, reaches the line last described near the 81st mile.

This is  $9\frac{1}{2}$  miles longer than the northern line, but the whole of it would be of the main line, while the northern would have a branch of 30 miles to Cantin's Bay, making  $20\frac{1}{2}$  miles more line to be constructed. The gradients on this line





, and the works would be very similar to those on the northern line first described.

On both lines there are detached tracts of land fit for cultivation, with spruce, aspen, cedar, birch and poplar, which would furnish railway ties. There is a small quantity of hemlock and pine, but most of the latter has been burnt off by bush fires. Cantin's Bay and near the Chaudière Rapids, there are large patches of sugar maple.

*Explorations with barometer and compass.*

The altitudes and distances from this forward must be taken as approximate. Distances hereafter referred to are estimated from the starting point of South Bay by the northern or direct route.

The River Wahnapiṭāpee is 200 feet wide where the line crosses it, and the altitude is 632 feet above sea level. Thence the line of survey takes a general northward course, ascending diagonally the slope or water shed of Lake Huron over a high and rocky country intersected with numerous, narrow, trough-like valleys, indented with lakes and swamps, rocky ridges intervening. Still, a feasible line has been found without very high gradients or exceptionally heavy work up to the Vermilion River, at the 106th mile. At the 85th mile it crosses the long valley running in a south-west direction, in which lies the chain of narrow lakes known as the Lake of the 1000 Islands. The altitude at this point is 810 feet. The rocks up to the 97th mile are generally gneissoid, but westward of this, slate is the characteristic of the country. The highest point on this section is at the 97th mile, where the altitude is 1010 feet: the crossing of Vermilion River, 106th mile, near the foot of Vermilion Lake, it is 1010 feet.

The line follows the north shore of Vermilion Lake 4 miles, then crosses a hilly rocky tract to Spanish River, which is reached at the 135th mile, altitude 1070 feet. Between this and the River Aux Sables, the country is very rough, and the course of the line tortuous.

The ascent is by terraces, and in some places is very abrupt, more especially from the 147th mile to Rocky River at the 150th mile, where the altitude is 1411 feet. There will be some high gradients, and a large proportion of heavy works throughout the section from Vermilion River to the River Aux Sables. At the 175th mile, the line crosses this river near the foot of Lake Aux Sables, altitude, 1512 feet. This is near the water shed between Lake Huron and Hudson's Bay. Thence its course is more uniform, and there is very little variation in the altitude for the next 100 miles, so that the gradients are very easy, and the works will be generally light or medium.

The line strikes the River Epinette at the 204th mile, about a mile above its confluence with the Mississauga. Thence it follows up this stream, and its affluent, the French River, to the source of the latter in Lake Wagong at the 220th mile, where the altitude is 1440 feet. It crosses the River D'Embaras at the 222nd mile, and passes the north end of Lake Winnibegon at the 235th mile. The River Montreal, Lake Superior, is crossed at the 274th mile, altitude 1410 feet, and the Shequamak at the 285th mile, where the altitude is 1345 feet.

On the last 12 miles the plateau is broken by numerous detached hills rising to a height of 300 or 400 feet. To avoid these, the curvature of the line would be increased, and the works would be heavier than on the rest of the plateau.

From the Shequamak to Lake Superior a new line was explored during the last season, keeping more to the north than that of 1876, passing by the head of Dog Lake and the valley of White River, and thereby avoiding the high ground east of Sand Lake River.

The line, however, is still open to objection in many parts. The country is intersected at intervals by deep valleys and high rocky ridges, often at nearly right angles to the general course of the line, causing great variations of altitude and a large amount of curvature, with occasional high gradients, involving a considerable proportion of heavy works.

At the 306th mile, the line reaches the valley of the Michipicoten near the foot of White Fish Lake, an expansion of the river, altitude 900 feet.

The River Magpie is crossed at the 335th mile, where the altitude is 963 feet. The highest intermediate point is 1,230 feet at the 318th mile.

From the Magpie to the head of White River at the 370th mile, the course of the line is tolerably direct, with generally easy gradients, and the works would not be heavy. The altitude at this point is 1,380 feet. Thence the line follows down the valley of White River to the 417th mile, where the altitude is 1,060 feet. There is a large amount of curvature in this section, but with easy gradients, and the works would be moderately light.

From White River to the River Pic, at the 440th mile, the country is rough and full of hills, the line tortuous, with high gradients, and the works generally would be rather heavy.

The last point is on the same level as Lake Superior, 600 feet. Thence the line passes through a valley to Heron Bay, and follows the shore of Lake Superior to Peninsular Harbour, where it joins the survey of 1874, at the 452nd mile. The shore of Lake Superior from Peninsular Harbour to the River Nepigon is deeply indented with numerous bays, coves and bights surrounded by high rocky bluffs, involving a large amount of curvature on the line with occasional high gradients, and, in construction, a large quantity of rock excavation with a number of short tunnels. (*vide* Report of 8th February, 1877, pages 206 to 210.)

The line crosses the River Nepigon near the foot of Lake Ellen, to which the length from South River is 569 miles; and if it were extended to a common point near the south-east angle of Lake Nipissing, it would be 26 miles longer than the line No. 2, explored in 1873. (*vide* Report of 26th January, 1874, page 205.)

Following the exploratory survey of 1874 from the River Nepigon *via* Dog Lake to a point on the line under construction from Fort William westward, the total length would be, approximately, 661 miles.

These exploratory surveys shew that a feasible line, with fair gradients and only a moderate proportion of rather heavy works, can be obtained from South River to Vermilion Lake, 106 miles. But between that point and the high plateau reached at Lake Aux Sables at the 175th mile, the country is not so favourable. The course of the line is tortuous, the rise occasionally abrupt, requiring high gradients, and a considerable proportion of the works would be heavy.

The almost uniform altitude of this plateau or watershed for a long distance on the line explored, and at different points where it has been crossed by previous surveys, suggests the course of avoiding the heavy works on the shore of Lake Superior by diverging from the present line at some point in the vicinity of Lake Winnibegon, and following the watershed which trends more to the northward, to Long Lake, and there joining the line No. 2 of the survey of 1873. Thence, it follows that line to the crossing of River Nepigon near its outlet from Lake Ellen.

If this were found favourable, we should then have the choice of two feasible lines between the south-east angle of Lake Nipissing and the River Nepigon; one passing the south of Lake Nipissing and the watershed between Lakes Huron and Superior and Hudson's Bay; the other running to the north of Lake Nipissing, and generally north of the watershed.

#### SURVEYS ON THE CENTRAL OR PRAIRIE REGION.

During the past season, surveys have been made with the view of improving the crossings of some of the rivers and deep ravines in this region, with the following results:—

*South Branch of the Saskatchewan; at the 878th mile, from Fort William, Lake Superior.*

The eastern approach to this river can be improved from a gradient of 0.75 per 100 to one of 0.50 per 100, or 26.40 feet per mile; but the line will be lengthened about a mile and one third, and the formation level above the bottom of the valley, raised from 88 to 95 feet.

*Grijzly Bear Coulé at the 1078th mile.*

By former surveys, the breadth of the Coulé or trough was 2200 feet at the top 30 feet at the bottom, and 155 feet deep. By the last survey it is 2400 feet wide at the top, 1200 feet at the bottom, and 125 feet deep. Neither the rate of the gradients nor the quantity of excavations in the approaches has been increased.

The summit altitude, west of the Coulé at the 1087th mile, has been reduced 54 ft, and the gradients have been improved.

*Buffalo Coulé at the 1101st mile.*

The breadth of this, by former surveys, was 1600 feet at the top, 700 feet at the bottom, and 100 feet deep, which is reduced by the last survey to 1200 feet at the top, 400 feet at the bottom, and 90 feet in depth.

*Suggested deviation of the line from Selkirk westwards, passing south of Lake Manitoba.*

In accordance with the verbal instructions of the Minister, an examination has been made of this line, with instrumental surveys of some of the deep valleys traversed by the line, and at other places where deemed necessary.

The deviation from the located line commences at the crossing of the Red River, and takes a south-westerly course till it reaches the centre of the range of townships lying north of the fourth base line; thence it follows due west on or alongside a road allowance through the centre of this range nearly up to the valley of the Little Saskatchewan. Thence, continuing westward, it crosses the Assiniboine at a point above the junction of Qu'Appelle River and through the Touchwood hills to the elbow of the North Saskatchewan at Caerlaverock.

The line throughout the Province of Manitoba, nearly 100 miles, is very favourable for railway construction, and the land is generally fertile. West of the Province Line the country is more broken, and the land becomes poorer.

The first serious difficulty is the crossing of the valley of the Little Saskatchewan, which is nearly a mile wide at the top, sloping gradually down to the river, where the valley is 225 feet deep. As it is obviously impracticable to cross this at right angles without enormously heavy works, the course of the surveyed line was deflected so as to follow obliquely down one side of the valley and up the other, by which the maximum gradient on the east side was reduced to 0.75 per 100, or 39.60 feet per mile for five miles in length, and on the west side to 1 per 100, or 52.80 feet per mile for a little over 4 miles in length. Thus it requires over 9 miles to cross this valley, carrying the line out of the direct course, which, together with the unavoidable curvature, will increase its length considerably.

The valley of Birdtail Creek, at the point crossed by this route is three quarters of a mile wide, and 190 feet deep in the centre.

The valley of the Assiniboine is over a mile wide, sloping abruptly down to the bottom flat, which is over 200 feet below the level of the plain. The river is 300 feet wide at flood, where it is crossed by a bridge near Fort Ellice.

No instrumental survey was made of these valleys, but they could probably be crossed in the same manner as the Little Saskatchewan.

The valley of Cut Arm Creek is over 100 feet deep where the trail crosses it.

The Touchwood Hills could be crossed without exceptionally high gradients, but with some rather heavy excavations; and the line would be sinuous, and consequently longer, than if a direct course were practicable.

Thence, to the bend of the North Saskatchewan at Caerlaverock, the country is similar to that traversed by the located line. A large proportion of the land on this line is only fit for pasture, and much of it is sandy or light soil, producing short grass. Among the Touchwood Hills, and in their vicinity, there are some tracts of good land fit for cultivation.

*Deviation to Quill Lake.*

An alternative line in the same general direction, may be thus described. Following the course of the last line up to the Little Saskatchewan, it then descends to the north-westward, crossing the Assiniboine near the mouth of Shell River, thence, passing to the north of the Touchwood Hills it joins the located line at Quill Lake.

The valley of Bird Tail Creek, where this line crosses, is nearly a mile wide at the top, and slopes gradually down to the river, where it is 175 feet wide. This could be approached on the east side by a narrow lateral valley, but there is no corresponding valley on the west side.

The valley of Shell River where the line strikes it, is 250 feet deep, over a mile wide at the top, and 1,000 feet on the bottom flat. It is possible to descend the slope of this valley to the bottom flat of the Assiniboine Valley, and after crossing to ascend by a lateral valley to the table land on the west side; this, however, can only be done by using high gradients, and with a large amount of curvature, by which the length of the line would be considerably increased. Some of the gradients on the survey were 70 feet to the mile; these, however, can probably be reduced to 1 per 100 or 52·80 feet per mile, but only with very heavy excavations.

The rest of the line to Quill Lake is favourable; a considerable proportion of the land is fit for cultivation; of the balance, some is good pasture land, the rest very poor.

It should be observed that the Engineer in Chief fixed the maximum gradient at 0·50 per 100 = 26·40 feet per mile rising eastward, and 1 per 100 = 52·80 feet per mile rising westward, and on the located line these gradients have been maintained from a point west of Battleford. They could not, however, be maintained on the suggested line; even with very heavy works a gradient of 1 per 100, each way, is the best that can be had for many miles.

This, together with the increased length caused by curvature and deflection from the general course, would render the line suggested much inferior to the located line for the economic working of the traffic, and would add considerably to the cost of moving to the seaboard the produce of the large and rich agricultural tract further to the north-west.

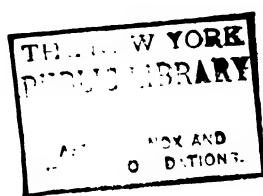
There are no data for estimating the difference of the cost of construction of the two lines, but this is a point of less importance than economic working after construction.

Comparing the extent of good lands that would be crossed by the suggested line and the suggested deviations, the latter have probably the advantage for the first 100 miles, viz., to the western boundary of Manitoba, as the lands in the Province are generally fertile, and in the portion that would be traversed by the proposed line, they are comparatively dry and free from timber, and are, therefore, more fit for rapid settlement; a good system of drainage, however, is required throughout the Province.

The located line also crosses large tracts of good land; and it should be kept in mind that even the *muskegs* or swamps, which are found on both lines, will be good meadow land when drained, as they are not deep: the side ditches of the suggested line alone will effect a great improvement in this respect, as they have done elsewhere. There is a considerable quantity of wood lands on the located line, chiefly in the north-west, which may possibly oppose certain difficulties to settlement, but which undoubtedly offers compensating advantages.

Beyond the first 100 miles from Selkirk there is a long stretch of land, of variable quality on both lines. But at the valley of Swan River the located line enters on a very extensive fertile tract. On the suggested deviation passing the Province Boundary, the quality of the land becomes inferior, as a small proportion is fit for cultivation westward up to the bend of the North Saskatchewan.

On the deviation from the Little Saskatchewan, north-westward to Quill Lake there are considerable tracts of good land fit for cultivation.





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This seemed to indicate that the fertile belt trends to the north-west, and more extended examination of the country was accordingly made, by which this view was confirmed.

A line drawn from Winnipeg to Fort à la Corne near the confluence of the two ranches of the Saskatchewan, would cut off the south-west angle of Lake Manitoba, skirt the north-eastern base of Riding Mountain, cross the north end of Duck Mountains, and pass 15 to 20 miles north of Fort Pelly and across the Basquia Hills. If his line were extended through the Beaver Valley to Lac la Biche, thence by the Lesser Slave Lake, so as to intersect the Peace River near the mouth of Smoky River, it would show the general course of the great fertile belt of agricultural lands in the North West Territory. It is not to be expected that in a stretch of over 1,000 miles the soil will be uniformly good. The fertile belt is accordingly very irregular, often intersected and contracted by *muskegs* and lakes, and low ranges of hills on which the soil is of variable quality; there are, however, vast tracts of extraordinary fertility. Both the quality of the soil and the salubrity of the climate improve towards the north-west; whilst investigations have shown that even beyond Peace River, the productive powers of the land are astonishingly great.

It is evident that no single line of railway can traverse all the fertile portions of a region so extensive, and that even before the trunk line is complete, branches will be required in various directions.

A branch line could be constructed, at a comparatively small cost, to meet the requirements of the Province of Manitoba equally well as a diversion of the main line, which, if carried out as suggested, could not fail to be injurious to the wider interests of the Dominion.

From all the information obtained up to this time, it does not appear advisable that any alteration should be made in the line as located in this district. There, however, appears to be a feasible line, which, after passing the south end of Lake Manitoba, takes a north-westerly course, skirting the eastern base of Riding Mountain and the north end of Duck Mountain, and joining the located line in the valley of Swan River.

The country is described as level and thickly wooded with spruce, poplar and some maple. (*Vide Report of April 10th, 1872: Page 56.*) Small lakes surrounded by extensive marshes are, however, found throughout this district.

The line suggested would be from 20 to 30 miles longer than the located line, but the gradients would probably be good, and the works moderately light, and it would, therefore, be somewhat less open to objection than the other deviations proposed.

#### SURVEYS IN THE WESTERN OR MOUNTAIN REGION.

During the season of 1877, the writer travelled over the route from the Saskatchewan, *via* the Yellowhead Pass, and the valleys of the Thompson and the Frazer to the Pacific coast, and closely examined the line at most of the difficult points of the survey. A complete location survey was made of that portion of the line from Tête Jaune Cache to Burrard Inlet, by which some of the difficulties and heavy work met with in former surveys have been avoided or reduced and the line generally much improved. When the plans and profiles are completed, and the quantities of the several classes of work got out, they will furnish better *data* for making an estimate of the cost of construction than have hitherto been obtained. A description of this survey by Mr. H. J. Cambie is appended.

#### EXPLORATION OF THE SKEENA ROUTE.

At the outset, it became evident that there is no harbour at the mouth of the Skeena suitable for a railway terminus. A fair anchorage is to be had in Cardona Bay, at the southern end of Kennedy Island, but it would be extremely difficult, if not impracticable, to reach that neighbourhood with a railway line.

Attention was therefore directed to Port Simpson, at the northern end of the Tsimpsan Peninsula, a well known and excellent harbour, and on examination it was found that there are no great obstacles to carrying a line along the north side of the Peninsula to that point.

The distance is probably 10 miles longer than to Cardena Bay, but, of the two, this harbour is far better adapted for commercial purposes, and the cost of constructing the railway would probably be much less.

### *Engineering Features.*

From Port Simpson, for about 35 miles along the north side of the Tsimpson Peninsula, and across the dividing ridge, 250 feet high, to the banks of the Skeena, the works would be heavy.

In ascending the Skeena through the Cascade Mountains the works would generally be heavy, but less so than by either the Fraser or Homathco valleys, through the same chain of mountains.

For the first 35 miles the hills descend in steep inclinations to the water's edge, and there are indications of snow slides at several points. The valley averages a mile in breadth, but the river is thickly studded with islands, and has channels washing the base of the mountains on either side.

Above this, for a distance of about 80 miles till the eastern face of the Cascade range is reached, the valley narrows a little, but the side hills are not so steep. The valley then opens out somewhat, and the works would be moderate for about 40 miles, which distance would bring the line to the Forks of the Skeena, near which there is an Indian Village named Kitma on the map.

The elevation at this point is about 700 feet above sea level, and the gradients would be very easy throughout the whole distance from the seaboard.

The general course of the line up to this point has been north-east, but here it leaves the Skeena and takes a south-east course at right angles to the former, ascending the valley of the Watsonquah, which for the first 27 miles is principally a canyon, and would require stiff gradients and heavy works in places.

The remainder of the distance via Lake Fraser to the valley of the Nechaco, would have easy gradients with moderately light works. The summit altitude between the Skeena and Nechaco, is only 2,400 feet above sea level. In this valley a junction is made with the previously surveyed line from Yellowhead Pass, (*Vide Report, February 8th, 1877, pages 274-276.*)

Several attempts were made to find a pass leading directly from the Skeena to Lake François, so as to avoid the angle between the former and the Watsonquah, and so greatly reduce the length of the line, but without success, as the space contained within the angle is a compact mass of high mountains.

The distances from a common point at the mouth of the Chilacoh, near Fort George, are as follows:—

	Miles.
To Fort Simpson, approximately.....	430
To Bute Inlet, by measurement.....	289
To Dean Inlet, by measurement.....	231

Fort Simpson is, however, much nearer to the Asiatic coast, the distances to Yokohama being as follows:—

	Statute miles.
From Fort Simpson.....	4,450
From Kamusquot Harbour, Dean Inlet.....	4,720
From Waddington Harbour, Bute Inlet .....	4,836

### *Character of the soil, &c.*

There is a small area of land in the neighbourhood of Port Simpson fit for cultivation. In the lower part of the Skeena, many of the islands with which it is studded, consist of rich alluvial soil, but they are subject to overflow at high water. For 15 or 20 miles below the Forks of the Skeena, and for some distance above that point, the hills do not approach the river within two or three miles on either side. The land is of fair quality, and covered with a light growth of poplar, birch and

pruce. There are some settlements at the Forks of the Skeena, where there was a fine crop of oats, almost ripe, on the 31st July, and also abundant crops of potatoes, carrots, cabbage, &c.

The slopes of the Watsonquah Valley throughout its length are, in part, prairie, and sustain a magnificent growth of grass fit for pasture. The roots of the grass intertwine and form a sod, so that it would not be killed off by allowing cattle or sheep to crop it closely, as bunch grass is.

This part of the country is, however, subject to summer frosts, which would render it unfit, or at least unreliable, for purposes of agriculture.

#### *Timber.*

A tree commonly called "yellow cypress" is found on the lower Skeena, which has great strength and density of fibre, and is said to be extremely durable, but the quantity is so limited that it may be said to have little commercial value. The same remark would apply to hemlock, though it was seen in some places of great size. On most of the islands subject to overflow, very fine cottonwood trees are to be found, which may be utilized at some future time for the same purpose to which basswood and whitewood are applied in the Province of Ontario.

#### *Snow Fall.*

Through the Cascade mountains, the snow in places lies to a depth of 7 or 8 feet on the level. From the Forks of the Skeena to the River Fraser, it is said not to exceed 3 feet in depth, except on very rare occasions.

#### *Minerals.*

Marble was seen in beds of great thickness, varying in colour from purple to white. Some ores of copper and lead were also observed, but not in veins of any great thickness.

### EXPLORATION OF THE PINE RIVER PASS.

The highly favourable reports received respecting the character of the Peace River District, and the prospects held out of a satisfactory route being obtainable through the Pine River Pass, made it expedient to obtain further information in that direction. Accordingly, the exploration was extended from a point in the neighbourhood of Lake Fraser, *vid* the east end of Lake Stewart, to Fort McLeod on the Parsnip, or south branch of the Peace River.

This route proved very unfavourable for railway construction: subsequently, however, a good connecting line, though more circuitous, was found by following down the Nechaco and the Stewart Valleys nearly to Fort George; thence, in a northerly direction, up the valleys of the Fraser and Salmon Rivers, and across the low watershed to Summit Lake, one of the sources of the Parsnip, which river was then followed down to Fort McLeod.

Beyond the existence of an Indian trail across the Rocky Mountains from Fort McLeod to Fort St. John, very little was known; nor was any information obtainable in the neighbourhood respecting the Pine River Pass, except through an old Indian woman, who drew a sketch on the sand, and explained it to the best of her ability.

With the scant information thus obtained, the exploration was continued from Fort McLeod eastward: following up the valley of the River Misinchinca, an affluent of the Parsnip, till an altitude of 5,500 feet was reached without any appearance of a Pass. On descending the river, a stream was discovered falling into it from the north, about 35 miles above its confluence with the Parsnip. Following this up four miles, it was found to issue from a small lake named Azuzetta. This proved to be near the summit of the Pine River Pass, its altitude being estimated at 2,430 feet above the level of the sea.

A little beyond this the head waters of the Pine River were struck, and the

river followed down eastward to the Forks, a point reached by Mr. Selwyn with a canoe from the Peace River in 1875. (*Vide Geological Survey of Canada, Report of Progress for 1875-76, pages 52 to 54.*)

The exploration was continued 30 miles eastward of the Forks on to the Beaver Plains, which lie between the Rocky Mountains and Peace River.

Thus the question of the feasibility of the Pine River Pass is at last solved. The full Report has not yet been received, but the distance between Fort McLeod on the west side of the Mountains, and the Forks of Pine River on the east side, is roughly estimated at 90 miles.

The gradients are stated to be generally easy with the exception of about 4 miles near the summit of the pass where they will probably be about 60 feet to the mile, and the works in the construction of a railway would be moderately light, except for a length of about eight miles near the summit of the Pass, and a short length at the Forks of Pine River, where they would be heavy.

The land in the Pine River valley for 50 miles above the Forks is described as of excellent quality, and well suited for agricultural and grazing purposes.

It should be observed that this fertile strip of land, lying nearly in the heart of the Rocky Mountains, is an extension of the Beaver Plains which connect with the great fertile belt, stretching from Manitoba to and beyond the Peace River.

Should the engineering character of a line by this route prove on closer survey as favourable as reported, the results from this exploration will be amongst the most important that have been obtained since the commencement of the surveys. Some of the serious difficulties in crossing the Rocky Mountains will have disappeared, and this formidable chain, once held to be insurmountable, and even now felt to be a grave obstacle to railway enterprise, can then be passed with very favourable gradients, and with works not exceeding in magnitude those generally required on other portions of the line.

In addition to the manifest advantages offered by this route, there is further the important consideration that in place of a bleak sterile country, wherein settlement is an impossibility for hundreds of miles, the line would traverse an area of remarkable fertility, with but a few short intervals of country unfit for settlement. This route also passes between the vast mineral districts of Omineca and Cariboo. The extraordinary results of recent mining operations in the latter give promise, when their resources are more fully developed—as they can only be with the assistance of direct Railway communication—of rivalling, if not surpassing, the far-famed gold and silver regions of the neighbouring States, which lie in the same mountain zone.

Port Simpson may possibly be considered, at present, too far north for the terminus of the Canadian Pacific Railway, but it is important that the fact should be borne in mind, that by virtue of low altitudes and consequent easy gradients, together with the comparatively moderate character of the works required to reach it, this terminal point offers advantages which would enable a Canadian line to defy competition for the trade with China and Japan. Port Simpson being fully 500 miles nearer to Yokohama than Holme's Harbour, at the mouth of Puget Sound, the proposed ultimate terminus of the Northern Pacific Railway, while the advantage it possesses over San Francisco is correspondingly greater.

But the Pine River Pass is not merely the key to Port Simpson; it affords comparatively easy communication with Bute Inlet, and all the intermediate inlets between that point and Port Simpson, the valleys of the rivers leading to these inlets radiating from the Stewart Valley, south west of the Pass, with exceptional directness. Thus many of the difficulties in the way of reaching Bute Inlet and the inlets to the north of it, *via* the Yellowhead Pass, can be avoided, and this probably without increasing the length of the line.

The distance from Livingstone on the located line, over the Yellowhead Pass to the confluence of the Chilacoh and Stewart Rivers, near Fort George, is 1,029 miles. The distance between the same points *via* the Pine River Pass measures on the map so nearly the same as the above that a survey alone can determine the precise difference between the two routes.

## WORKS OF CONSTRUCTION.

### TELEGRAPH LINE.

Commencing at Fort William, the line is erected to a point named "Falcon," a distance of 137 miles, and is in operation to English River, 113 miles. Between Falcon and Keewatin, 160 miles, considerable clearing has been done, and a line erected for a distance of 30 miles eastward from Keewatin. Between Keewatin and Selkirk, 112 miles, the line is erected and in operation. It is expected that the connection between Fort William and Selkirk will be completed during the winter.

The line is erected and in operation between Selkirk and Livingstone, 271 miles, but where it crosses certain lakes, ponds and marshes, a number of the poles require to be more permanently secured. The branch line between Selkirk and Winnipeg, a distance of 22 miles, is completed and in operation.

The line is erected, and has been operated from Livingstone to a point in the longitude of Fort Edmonton. There is still, however, a considerable amount of clearing to be done, some inferior poles to be replaced, and some portions to be altered. At present, it is only in operation as far as Battleford.

On the western Section, between Edmonton and the existing line in British Columbia, no portion of the line is completed, but a quantity of material has been delivered at points along the route.

### GRADING, TRACK-LAYING, &c.

#### *Fort William to English River, 113 miles.*

From Fort William, westward, the roadbed of the railway is graded continuously, and the bridges erected to the 77th mile; beyond this point there is an aggregate of four miles more graded in detached portions. The rails are laid for a distance of 41 miles, and of this about 36 miles are partially ballasted, and in fair running order.

#### *English River to Keewatin (Rat Portage,) 184 miles.*

The line has been located for construction between these points, but is not under contract.

#### *Keewatin to Cross Lake, 36 miles.*

From Keewatin, westward, for a distance of 23 miles, a considerable quantity of excavation has been done, consisting chiefly of rock. From the 23th to the 36th mile supplies are being delivered, but grading has not been commenced.

#### *Cross Lake to Selkirk, 76 miles.*

From Cross Lake, westward, for a distance of 11 miles, there has been no grading done. From the 11th to the 43rd mile the grading is in various stages of progress, 17 miles of the distance, in detached portions, being ready for track laying. From the 43rd to the 76th mile the grading and bridging are completed, and the roadbed is in good condition for tracklaying. The rails are laid, but not ballasted, for a distance of 6 miles eastward from Selkirk.

#### *Pembina Branch.*

The length of this branch is 84½ miles, extending southward from the main line at Selkirk to the International Boundary at Emerson. Between Selkirk and St. Boniface, opposite Winnipeg, a distance of 22 miles has been graded during the past summer, and the rails laid over the same, but it is not ballasted. From the 22nd to the 29th mile, no grading has been done. From the 29th mile to Emerson, the grading was completed in 1875, with the exception of the spaces left for bridges and approaches.

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**ENGINE HOUSE.**

A ten stall engine house has been completed at Fort William.

**ENGINEERS' HOUSES.**

At Fort William a good house has been built for the District Engineer, and between that point and Selkirk, 18 smaller houses have been erected for the use of the Assistants on the line during construction, which, after the line is opened for traffic, will come into use in connection with the stations.

**FORT FRANCES LOCK.**

The rock excavation is nearly completed. The timber for the gates will be procured during the winter. For description of this work, *vide* Report of 1876. Appendix, p. 205-208.

**CONTRACTS.**

A schedule of contracts, with statement of expenditure upon the same during the fiscal year ended 30th June, 1877, is appended.

I have the honour to be, Sir,

Your obedient servant,

MARCUS SMITH,  
Acting Engineer in Chief.

F. BRAUN, Esq., Secretary,  
Department Public Works.

# CANADIAN PACIFIC RAILWAY.

SCHEDULE OF CONTRACTS with Statement of Expenditure upon the same, during the Fiscal Year ended 30th June, 1877.

[1877]

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Contract No.	Character of Works.	Date of Contract.	Name of Contractors.	Amount expended during Fiscal Year ended 30th June, 1877.
1	Construction of Telegraph Line, Fort Garry to Livingstone .....	1874.	Sifton, Glass & Co .....	\$ cts
2	do Livingstone to Edmonton .....	Oct. 17 .....	do .....	25,780 80
3	do Edmonton to British Columbia .....	do 30 .....	R. Fuller .....	32,414 95
		Nov. 10 .....	F. J. Barnard .....	8,900 00
4	do Lake Superior to Fort Garry .....	1875.	Oliver, Davidson & Co .....	40,027 66
		Feb. 19 .....		
		1874.		
5	Pembina Branch { Grading .....	Aug. 31 .....	Joseph Whitehead .....	13,298 00
	{ Extension St. Boniface to Selkirk, Grading, Bridging } and Tracklaying .....			990 00
13	Fort William to Sunshine Creek, Grading and Bridging .....	1875.	Sifton & Ward .....	114,110 00
14	Red River to Cross Lake, Grading and Bridging .....	April 3 .....	Sifton & Ward .....	130,470 00
		do 3 .....		
15	{ Cross Lake to Rat Portage, Grading and Bridging .....	1877.	Sutton, Thompson & Whitehead .....	54,300 00
	{ Red River to Rat Portage, Tracklaying and Ballasting .....	June 9 .....		
23	Railway Sleepers No. 56,339 .....	1875.	Sifton & Ward .....	3,669 79
		Oct. 4 .....		
25	{ Sunshine Creek to English River, Grading and Bridging .....	1876.	Purcell & Ryan .....	335,800 00
26	{ Fort William to English River, Tracklaying and Ballasting ..	June 6 .....		
28	Ten Stall Engine House, at Fort William .....	July 17 .....	James Iabester .....	16,600 00
29	Railway Spikes, 150 Tons, delivered at Fort William .....	July 28 .....	Cooper, Fairman & Co .....	8,532 90
32	Railway Spikes.. { 200 tons delivered at Duluth .....	1877.	Cooper, Fairman & Co .....	13,647 50
	{ 50 do Fort William .....	May 12 .....		



## CANADA PACIFIC RAILWAY.

## REPORT OF LOCATION SURVEY FROM YELLOWHEAD PASS TO BURRARD INLET.

OTTAWA, 19th December, 1877.

SIR,—I beg leave to submit the following description of the trial location survey of the line from Yellowhead Pass to Burrard Inlet made during the summer of 1877.

From the summit of Yellowhead Pass, to 38th mile westward the line is common to all the routes through British Columbia. Commencing at that point a trial location was made by the Rivers Albreda and Thompson, and the lower part of the River Fraser to Burrard Inlet.

The plans and profiles are as yet incomplete and the description here given may hereafter be somewhat modified.

*Point of divergence to Cranberry Lake—38 to 58 miles.*

For the first eight miles the work is in rock and heavy, the remainder consists of nine miles of light work and two of heavy, in sand and gravel. The principal stream to be crossed is McLennan's Creek, 100 feet wide. The alignment and grades are easy throughout.

*Cranberry Lake to North Thompson—58 to 85 miles.*

For three miles from Cranberry Lake to River Canoe the work is heavy, of the remaining distance, eight miles, may be classified as heavy, and the rest of the line varying from medium to light. The material is principally sand, gravel and boulders with about three miles in rock. River Canoe, 120 feet wide, River Camp 70 feet wide, and River Albreda 200 feet wide, have to be bridged. The grades are steep, the heaviest descent being in the Albreda valley where there is one stretch of 1 per 100 over 3 miles long, and two others, each upwards of a mile, and on these grades there are curves of 1,146 feet radius.

*North Thompson Valley—85 to 102 miles.*

Near the 85th mile, the line crosses the River Thompson with 300 feet of bridging, and then follows its west bank. Being to a large extent on the hill side, some sharp curvature has to be resorted to, four curves of 820 feet radius were used, but at such places the gradients are trifling, and are throughout, undulating and easy. The work may be classed as medium with the exception of one point, near the 86th mile, where the main mountain abuts on the river.

*North Thompson Valley—102 to 120 miles.*

For the first four miles, the line is on benches requiring heavy work. From that point forward it is on flats and the work is light except at a few places where the base of the hill is washed by the river, causing some rock spurs to be cut through. The principal streams to be bridged are Green River 75 feet, and Blue River 100 feet wide. The grades are light and undulating and curvature easy.

*North Thompson Valley—120 to 130 miles.*

This section is all on side hills, and embraces the canyon of the North Thompson four miles in length. The works are generally in rock and for six miles are very heavy, with one tunnel of 350 feet, and another of 150 feet long. Although the descent through the canyon is rapid, only  $1\frac{1}{2}$  miles of 1 per 100 grade will be necessary. The sharpest curves are 1146 feet radius. No large streams are met.

*North Thompson Valley—130 to 143 miles.*

This section is on the flats adjoining the stretch of river known as Stillwater. Two rock spurs and one of gravel touch the river and have to be cut through, the rest of the work is almost exclusively embankment, and not heavy. No large structures are required. The grades and curves are light.

*North Thompson Valley—143 to 164 miles.*

Six miles of this are on side hills and require heavy work, one-third of which is in rock. The remaining 15 miles are on benches and flats, with medium works, principally in gravel and boulders. Several places have to be protected against encroachment of the river, and two points against earth sliding from above in the spring of the year. The grades are undulating, with four stretches of 1 per 100, the longest of which is  $1\frac{1}{2}$  miles. To avoid tunnelling, a curve of 716 feet radius was used on a grade of 26 feet per mile. Mad River, 60 feet wide, is the only stream of consequence to be crossed.

*North Thompson Valley continued to Clearwater—164 to 182 miles.*

About four miles of this distance are on the steep side hill, close to the river, and require protection in many of the bays.

There are about six miles of heavy work, principally in sand and gravel, the rest is light. Near the 171st mile the line crosses the North Thompson to its eastern bank, which is then followed to Kamloops. This crossing is 350 feet wide, and no other river of importance is met with on the section. The grades are easy and undulating, and the curvature is not serious.

*Clearwater to Indian Reserve—182 to 206 miles.*

Assiniboine Bluff and some other side hills abut on this part of the river, and cause about eight miles of heavy work, a large proportion of which is in rock. The other 16 miles may be classified as medium work. Curves and grades are easy. No large streams have to be crossed.

*Indian Reserve to Head of Rapids—206 to 220 miles.*

Most of this distance is on the flats next river, where work is light.  $2\frac{1}{2}$  miles of heavy work occur in sand and gravel. Some river protection is required. The only large stream to be bridged is the Barrière, 350 feet wide. The curves are easy, and grades light.

*Head of Rapids to Kamloops—220 to 255 miles.*

This section includes two side hills, one five miles and the other  $3\frac{1}{2}$  miles long, on which the work is heavy. The rest varies from medium to light. Near the 254th mile the South Thompson River, 300 feet wide, is crossed close to its confluence with the North Thompson. The grades and curves are light.

*Kamloops to Savonas' Ferry—255 to 280 miles.*

From Kamloops the line follows the Thompson River for seven miles, with easy work and gradients to Kamloops Lake. In following down the south shore of the lake, Cherry Creek bluff and some others of bold, irregular outline have to be passed, entailing six tunnels of a total length of 2,750 feet. The work along the lake is principally in rock, all of it heavy, and eight miles of it excessively so. In passing the bluffs it was found necessary to use curves of 955 feet radius, and gradients of 1 per 100 are of frequent occurrence. No large streams have to be crossed.

*Savonas' Ferry to foot of Black Canyon—280 to 308 miles.*

Of this distance six miles may be classified as light work. All the rest is on the face of benches adjacent to the River Thompson, causing heavy work, which requires protection from wash at many points. The proportion of rock work, however, is not large. Near the 307th mile a ridge of rock forming a sharp bend in the river necessitates a tunnel 550 feet in length. No large streams have to be crossed. Curves of 1,146 feet radius were frequently used. The grades are undulating and short, requiring in several instances 1 per 100.

*Foot of Black Canyon to Spence's Bridge—308 to 327 miles.*

This section is partially similar in character to that last described. Through nearly half of it the work is of a light character and the balance heavy, requiring river protection at many places. There is but little rock excavation. The curves are numerous, 955 feet radius being the sharpest. The grades undulate. Near the 326th mile the River Nicola, 300 feet wide, has to be bridged.

*Spence's Bridge to Lytton—327 to 350 miles.*

The valley of the River Thompson, for most of this distance, is narrow, and the line is located along the face of steep side hills, advantage being taken of benches at a few points where available. The work may be classified as heavy, with a large proportion in sand, gravel and boulders. The River Nicomen, 150 feet wide, and a few rocky ravines, are the only places requiring structures of importance. Several curves of 1,146 feet, and two of 955 feet radius, represent the heaviest curvature. The grades are undulating and easy, there being but one mile of 1 per 100.

The worst feature in this section is a sort of mud glacier, met with near the 333rd mile, known as the "Mud Slide."

At the point where the line crosses, it is about 1,000 feet wide and slides forward at the rate of about 8 feet per annum, a movement which mostly occurs in spring. This movement is greatest at the centre and decreases towards the sides. The whole presents a rugged broken face, about 50 feet high at the River Thompson, where it breaks off and is washed away at time of freshet.

The head of this slide is about two miles from the line and 1,900 feet above it, and it seems to be caused by springs in that neighbourhood which disappear into the ground and re-appear again at intervals, making the earth, which is strongly impregnated with alkali, dissolve to the consistency of soap, and thus form a lubricator between the bed rock and the mass of earth above. It is hoped, however, that by careful drainage of the springs near their sources, and by diverting them elsewhere the slide can be so far stopped as to avoid any extraordinary expenditure for maintaining the work.

*Lytton to Crossing of the River Fraser—350 to 356 miles.*

The line descends gently on sand and gravel benches, with heavy work and much curvature for  $5\frac{1}{2}$  miles. It then crosses over to the right bank of the River Fraser and continues down that side all the way to Burrard Inlet. The crossing of the Fraser is 500 feet wide at formation level, and about 120 feet above low water mark. Immediately after passing the River and on the same straight line, there is a tunnel 600 feet long through a rock bluff.

*Crossing of the River Fraser to Boston Bar—356 to 379 miles.*

The work is heavy throughout this section, being in rock for upwards of one-third of the distance. The Na-ah-latch River, 120 feet wide, and about 12 large ravines have to be crossed. The curves are numerous, but none sharper than 1,146 feet radius. The grades undulate and the maximum 1 per 100 has often to be introduced.

*Boston Bar to Yale—379 to 403 miles.*

At Boston Bar the line enters the canyons of the River Fraser, which extend to Yale. Five miles of the distance is over benches with medium work, and the rest on a broken rocky side hill, or along the face of almost perpendicular bluffs, entailing heavy rock excavation, and ten tunnels, the united length of which is about 5,650 feet (= 1.07 miles) the longest being 1,550 feet. The largest streams on this section are the Skuzzy about 80 feet, the Spuzzum about 100 feet wide, and three other smaller streams. There is one curve near Yale of 820 feet radius on a level; with this exception 1,146 feet is the shortest radius used. The grades undulate and there are about seven miles of 1 per 100. Near the 384th mile is a ravine, down which snow sometimes slides, but as the grade is high and requires a bridge at this point, the snow can pass underneath, and no danger need be apprehended.

*Yale to Sister Rocks—403 to 413 miles.*

The work is moderate, being chiefly on gravel benches, with easy, undulating gradients and a small percentage of curvature; five creeks have to be bridged, which vary in width from 40 to 80 feet.

*Sister Rocks to flat below Hope—413 to 419 miles.*

From the Sister Rocks, for a distance of six miles to a flat three miles below Hope, the work is heavy, with a considerable number of sharp curves on undulating gradients, principally 1 per 100. There are three short tunnels, amounting in the aggregate to 1,275 feet.

*Flat below Hope to Harrison River—419 to 444 miles.*

The work on this section is moderate, four-fifths of it being on benches and flats, and the remainder along bluffy and broken side-hill, with one tunnel 230 feet in length. One creek 100 feet wide has to be crossed. At the time of high water the toe of embankments will be subject to flood at several points, but no apprehension need be felt as to stability of line, as these banks will be of rock, and in no case subject to wash.

*Harrison River to St. Mary's Mission—444 to 462 miles.*

Eleven miles of this work varies from medium to heavy, with a small proportion of rock, the other seven miles are on a low flat, liable to an overflow at extreme flood of from three feet to twelve feet, entailing heavy works. The principal streams to be bridged are the Harrison, with a waterway of 900 feet, and an extreme depth of 27 feet; the Hatzic, 140 feet wide, varying from 6 feet to 14 feet in depth; and one other stream 100 feet wide. The grades are undulating, and curves easy.

*St. Mary's Mission to Pitt Meadows—462 to 482 miles.*

Five miles of this may be classified as medium, the remaining distance heavy, with little rock. River Stave, 100 feet wide and 20 feet deep at centre, with Kanaka Creek 400 feet wide, are the largest rivers to be crossed. The alignment and grades are easy.

*Pitt Meadows to Port Moody—482 to 493 miles.*

This section includes the Pitt Meadows, which are four miles wide and subject to an overflow at extreme flood of about seven feet in depth, requiring expensive works of construction. The remainder of the work varies from medium to light, without rock excavation, so far as known. Where the line crosses the River Pitt, it is 1,000 feet wide, and varies from five to 45 feet in depth. The Coquitlam, 200 feet wide, is the only other stream of importance. The curves are easy and the grades light.

To extend the line from Port Moody to English Bay, along the southern shore of Barrard Inlet, the distance is 15 miles. Many sharp, rocky spurs extend to the water's edge, entailing heavy cuttings with a large percentage of rock. The grades are easy and the curves light.

From the foregoing it will appear that 1 per 100 is the maximum gradient used and some of the heaviest works met with in the exploratory surveys have been considerably reduced; the aggregate length of tunnelling being now a little over  $2\frac{1}{2}$  miles. A considerable portion of these reductions, however, has been effected by introducing more curvature, and using sharper curves at certain points than had heretofore been employed, one of these being 716 feet radius and several 820 feet radius, but they were used only in localities where the line is level or the gradients of trifling ascent.

The subjoined statements apply to the line from the 38th mile to Port Moody, and afford information which cannot claim to be strictly accurate, owing to the incomplete state of the profiles.

*Level.*

There are 157 miles of line practically level—a portion being on a grade of less than five feet per mile.

*Maximum Grade of 1 per 100.*

Of this grade there are—

	Miles.
65 stretches ascending east, amounting to.....	46 $\frac{22}{100}$
34 stretches ascending west, amounting to .....	27 $\frac{10}{100}$
The longest ascending east is a little under.....	3 $\frac{1}{2}$
The longest ascending west is a little under.....	5 $\frac{3}{4}$

*Classification of Work.*

43 miles may be styled excessively heavy, 106 miles heavy, 156 miles moderate and 60 miles light.

*Waterway of Rivers to be crossed.*

1 River	1,600 feet in width.
1 "	1,400 feet in width.
1 "	900 feet in width.
3 "	varying from 350 to 400 feet in width.
5 "	250 to 300 "
2 "	" 160 to 200 "
8 "	" 100 to 150 "
7 "	" 60 to 90 "
2 "	" 30 to 50 "

In passing the Cascade Mountains on this route the ravine near the 384th mile already referred to, is the only place where snow is now known to slide from any considerable height across the proposed line of railway. Heavy drifts occur at various points where the configuration of the ground favors their formation, and will entail the construction of snow sheds. The hill sides were carefully examined for traces of avalanches, but none were found, and this result was corroborated by the testimony of people residing in the neighbourhood who travel the road continually, no danger therefore, need be anticipated from that source. On that portion of the line, however, in the Fraser Valley above the Tête Jaune Cache the mountain sides are very steep, and are grooved at places by avalanches of snow, timber and loose rock.

The maps and sections are being completed with as much despatch as possible in order that exact and precise information with regard to the route be submitted at an early date.

I have the honor to be, Sir,

Your obedient servant,

H. J. CAMBIE,

*Deputy Engineer in Charge  
Surveys,*

*British Columbia.*

MARCOUS SMITH, Esq.,  
Acting Engineer-in-Chief,  
Ottawa.

## APPENDIX No. 23.

### DEEPENING CHANNEL BETWEEN QUEBEC AND MONTREAL.

HARBOUR COMMISSIONERS OF MONTREAL,  
SECRETARY'S OFFICE,  
MONTREAL, 7th Dec., 1877.

SIR,—Referring to your letter of the 23rd ultimo, I have the honour, by direction of the Harbour Commissioners of Montreal, to forward herewith, for the information of the Hon. the Minister of Public Works, copy of the Report of Mr. Kennedy, Chief Engineer of the Trust, on the dredging operations now being carried on for the deepening of the ship channel between Montreal and Quebec, for the fiscal year ended 30th June last.

I am also to state that the expenditure during the year was \$142,653, making a total of \$883,131 expended from the commencement of the work up to the close of the last fiscal year, under the Act 36, Chap. 60.

I have the honour to be Sir,

Your most obedient servant,

H. D. WHITNEY,  
*Assistant Secretary.*

F. BRAUN, Esq., Secretary,  
Department of Public Works,  
Ottawa.

HARBOUR COMMISSIONERS OF MONTREAL,  
CHIEF ENGINEER'S OFFICE,  
MONTREAL 27th Nov. 1877.

DEAR SIR,—I beg to furnish the following statement shewing the condition of the work of deepening the River St. Lawrence, under the Harbour Commissioners, at the close of the last fiscal year of Government, as required by Mr. Braun, Secretary of Public Works, in his letter to you of 23rd instant.

Operations have been carried on at the undermentioned places in the ship channel between Montreal and Quebec, the plant employed consisting of:—

1. Eight elevator dredges;
2. Seven screw tugs;
3. One side-wheel steamer.
4. One stone-lifter;
5. Five barges (coal tenders and store ship);
6. Eighteen hopper-bottomed scows.

*Cap Charles.*

Work was carried on during the season of navigation with one dredge, assisted when necessary by a stone-lifter for removing large boulders; and at the close of the fiscal year the north half, or 150 feet in width of the new ship channel had been cut through the shale rock of the Grondine Shoal to a depth of 20 feet at low water, and considerable progress had been made toward making the south half to the same depth.

There were raised during the year 11,340 cubic yards of shale rock and boulders at an average cost of about \$1.18 per cubic yard.

*Cap-la-Roche.*

The cutting of a new and straight channel through the shale rock which forms the Cap-la-Roche Shoal, was commenced a few days before the close of the fiscal year, and up to that time 968 cubic yards of rock had been raised.

*Lake St. Peter.*

Dredging was continued until the middle of October, 1876, with three dredges, and resumed in the spring of the present year with four dredges, and at the end of June the channel had been cleared to a depth of  $22\frac{1}{2}$  feet at low water to an average distance of about  $1\frac{1}{2}$  miles above the "White Buoy."

The dredging is all of soft clay, and the total quantity raised during the year amounted to 703,575 cubic yards, at an average cost of  $8\frac{1}{2}$  cents per yard.

*Contrecoeur Channel.*

The main portion of the new Contrecoeur Channel was completed to 22 feet deep and 300 feet wide, at the close of navigation in 1876, but the removal of some small shoals at the lower entrance remained to be finished in 1877.

Dredging was resumed for this purpose in the spring, and at the close of the year nearly the whole was completed. Total quantity raised during the year, 272,640 cubic yards, consisting chiefly of stiff clay, and costing about 16 cents per yard.

*Cap St. Michel, Ile Delorier and Varennes.*

The improvements consist of the removal of a series of shoals and points of shoals which interfered with both the depth and breadth of the ship channel. Total quantity dredged during the year, 128,400 cubic yards, consisting of clay and boulders, and costing about  $20\frac{1}{2}$  cents per yard.

*Point aux Trembles.*

Dredging was commenced in the autumn of 1876, for the purpose of deepening the channel and improving its course by conforming as far as practicable with the direction of the current setting to the south of Ile Ste. Thérèse. Total quantity dredged, 82,425 cubic yards, costing about  $16\frac{1}{2}$  cents per yard.

I am, Sir,

Your obedient servant,

JOHN KENNEDY,  
*Chief Engineer.*

## APPENDIX No. 24.

## DEPARTMENT OF PUBLIC WORKS.

Name.	Occupation.	Locality.	Annual Salary.	Remarks.
OFFICE STAFF.			\$ cts.	
T. Trudeau .....	Deputy of the Minister...		4,100 00	
F. Braun .....	Secretary .....		2,400 00	
John Page .....	Chief Engineer .....		4,000 00	
G. F. Baillairgé .....	Assistant Chief Engineer .....		3,000 00	
T. S. Scott .....	Chief Architect .....		3,000 00	
J. Baine .....	Accountant .....		2,200 00	
J. W. Harper .....	Paymaster .....		1,530 00	
H. A. Fissault .....	1st Class Clerk .....		1,800 00	
L. E. St. O. Chapleau .....	do .....		1,600 00	
W. Buckingham .....	do .....		1,800 00	
F. H. Ennis .....	do .....		1,550 00	
C. McCarthy .....	do .....		1,650 00	
O. Dionne .....	do .....		1,550 00	
A. P. Bradley .....	do .....		1,550 00	
W. J. Tilley .....	Senior 2nd Class Clerk .....		1,350 00	
J. N. F. Bonneville .....	do .....		1,500 00	
S. McLaughlin .....	do .....		1,400 00	
O. F. Street .....	do .....		1,250 00	
A. J. Duffy .....	Junior 2nd Class Clerk .....		900 00	
L. Lefebvre .....	do .....		900 00	
L. N. Fortier .....	do .....		900 00	
A. E. Evanturel .....	do .....		1,000 00	
L. H. Filteau .....	do .....		900 00	
L. D. Dion .....	do .....		900 00	
F. A. Dixon .....	do .....		900 00	
E. Bance .....	do .....		750 00	
W. Buckingham .....	Private Secretary .....		600 00	
J. Deslauriers .....	Messenger .....		500 00	
M. Walsh .....	do .....		500 00	
H. Potvin .....	do .....		500 00	
C. Neville .....	do .....		17 00	per month.

## LACHINE, BEAUHARNOIS, CHAMBLY AND RIVER OTTAWA CANALS.

J. G. Sippell .....	Engineer-in-Charge .....		250 00	per month.
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## ST. LAWRENCE CANALS.

Michael Conway .....	Superintendent .....	Lachine Canal .....	1,800 00	
J. F. Béique .....	do .....	Beauharnois do .....	1,100 00	per year—rent \$150.
D. A. McDonell .....	do .....	Cornwall Canal .....	1,400 00	per year—rent \$200.
A. G. MacDonell .....	do .....	Williamsburg Canals .....	1,100 00	
R. Cardinal .....	Paymaster .....	St. Lawrence Canals .....	1,300 00	per year.
E. V. Bodwell .....	Superintendent .....	Welland Canal .....	2,900 00	
R. D. Dunn .....	Paymaster .....	do .....	1,400 00	



Name.	Occupation.	Locality.	Pay.	Remarks.
OTTAWA CANALS.			\$ cts.	
John D. Foreman.....	Lock Superintendent.....	St. Anne's Lock.	800 00	per annum.
Wm. B. Forbes .....	Superintendent.....	Carillon & Grenville Canals....	1,175 00	Per ann. Value of house.....125 00

## CHAMBLY CANAL.

Levi Larue.....	Lock Superintendent.....	St. Ours' Lock...	2 00	per day and \$150 house rent.
L. Ouimet.....	Superintendent.....	Chambly Canal..	1,100 00	per annum and \$150 house rent.

## ST PETER'S CANAL.—CAPE BRETON.

W. M. Kavanagh.....	Lock Superintendent....	.....	400 00	per annum.
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## RIDEAU NAVIGATION.

Fred. A. Wise .....	Supt. and Engineer.....	Office Staff.....	2,000 00	per annum.
Francis Abbott.....	Book-keeper .....	do .....	1,000 00	do

## SLIDES AND BOOMS.

T. D. Belcher.....	Superintending Engineer	River Trent and Newcastle Dist.	1,000 00	per annum.
G. P. Brophy.....	Superintending Engineer	River Ottawa Works.....	1,800 00	do
D. Scott .....	Clerk and Accountant...	do .....	900 00	do
D. Boulanger.....	Slide Master.....	River Saguenay Works.....	400 00	do

## INTERCOLONIAL AND PRINCE EDWARD ISLAND RAILWAYS.

O. J. Brydges.....	General Superintendent..	Railways .....	8,000 00	per annum.
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## INTERCOLONIAL RAILWAY.

R. Luttrell.....	Superintendent.....	Traffic Department.....	3,000 00	per annum.
A. McNab .....	Engineer.....	Engineer Department .....	4,000 00	do
Thos. Foot .....	Accountant .....	Accountant Department.....	2,400 00	do
H. A. Whitney.....	Mechanical Superintendent.....	Mechanical Department .....	3,000 00	do
D. Pottinger.....	General Storekeeper .....	Stores Department .....	1,800 00	do

Name.	Occupation.	Locality.	Pay.	Remarks.
PRINCE EDWARD ISLAND RAILWAY.			\$ cts.	
W. McKechnie .....	Superintendent .....	Charlottetown...	2,500 00	
Alex. Devine.....	Clerk .....	do ...	720 00	
Thomas Williams.....	Accountant .....	do ...	1,400 00	
Hon. Benj. Davies....	Cashier and Paymaster...	do ...	1,200 00	
E. O. Faulkner.....	Travelling Auditor .....	do ...	1,100 00	
Alex. Stronach .....	Mechanical Superintend.	do ...	1,500 00	per annum.
G. C. Cunningham.....	Resident Engineer.....	do ...	2,000 00	do

## APPENDIX No. 25.

TABLE showing the dates of the closing of Canals and Harbors in the autumn of 1876, and the opening in the spring of 1877.

Canals or Harbors.	Closing.		Opening.	
Lachine Canal.....	Dec.	2., 1876.....	May	7., 1877
Beauharnois Canal.....	Nov.	29 ".....	"	5 "
Cornwall do.....	Dec.	8 ".....	"	26 "
Williamsburgh Canals.....	"	5 ".....	"	1 "
Welland Canal.....	"	15 ".....	April	17 "
Burlington Bay Canal.....	"	11 ".....	"	11 "
St. Ann's Lock and Dam.....	Nov.	29 ".....	"	21 "
Carillon Canal.....	"	30 ".....	"	26 "
Grenville do.....	"	30 ".....	May	1 "
Châte à Blondeau Canal.....	"	30 ".....	April	26 "
Rideau..... { Kingston Mills.....	"	27 ".....	"	31 "
{ Ottawa.....	Dec.	7 ".....	May	1 "
St. Jurs' Lock.....	Nov.	30 ".....	April	10 "
Chambly Canal.....	"	28 ".....	May	1 "
Erie Canal (New York).....	Dec.	1 ".....	"	8 "
St. Peter's Canal (Cape Breton).....	Closed since June, 1876.			
Quebec Harbor, River St. Lawrence.....	Nov.	26., 1876.....	April	26., 1877
Montreal do do.....	Dec.	10 ".....	"	29 "
Toronto do Lake Ontario.....	"	18 ".....	March	25 "
Kingston do do.....	"	30 ".....	April	9 "
Belleville do Bay of Quinté.....	"	5 ".....	"	14 "
Port Stanley do Lake Erie.....	Nov.	24 ".....	"	10 "
Kingsville do do.....	"	28 ".....	"	12 "
Windsor do River Detroit.....	Dec.	10 ".....	"	3 "
Sarnia do Lake Huron.....	"	18 ".....	"	7 "
Goderich do do.....	Nov.	30 ".....	"	28 "
Kincardine do do.....	"	29 ".....	"	30 "
Owen Sound do Georgian Bay.....	Dec.	6 ".....	May	5 "
Collingwood do do.....	"	1 ".....	"	4 "
Midland Harbors do do.....	"	4 ".....	April	15 "
River St. Mary do do.....	Nov.	27 ".....	May	2 "
River Kaministiquia, Lake Superior.....	"	22 ".....	April	22 "
Prince Arthur's Landing, do.....	Dec.	3 ".....	"	29 "
Winnipeg Harbor, Red River.....	Nov.	5 ".....	"	22 "

ANNUAL REPORT  
H. V. & H. W. FORT  
1878

# MINISTER OF PUBLIC WORKS

FOR THE

FISCAL YEAR 1ST JULY, 1877. TO 30TH JUNE

1878.

ON THE WORKS UNDER HIS CONTROL

PRINTED IN ACCORDANCE WITH THE PROVISIONS OF THE ACT TITLED  
VICTORIA, CHAPTER TWELVE, SECTION NINETEEN.

PRINTED BY ORDER OF THE HOUSE OF COMMONS



OTTAWA :  
PRINTED BY MACLEAY, ROBERT & CO. WELLINGTON STREET  
1878



# ANNUAL REPORT

OF THE

# MINISTER OF PUBLIC WORKS,

FOR THE

FISCAL YEAR 1ST JULY, 1877, TO 30TH JUNE,

1878.

ON THE WORKS UNDER HIS CONTROL

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SUBMITTED IN ACCORDANCE WITH THE PROVISIONS OF THE ACT THIRTY-FIRST  
VICTORIA, CHAPTER TWELVE, SECTION NINETEEN.

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PRINTED BY ORDER OF THE HOUSE OF COMMONS.

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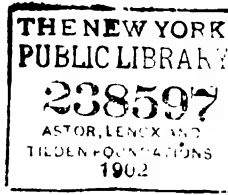


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1879.

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**REPORT**  
**OF THE**  
**MINISTER OF PUBLIC WORKS,**  
**FOR THE**  
**FISCAL YEAR ENDED 30TH JUNE, 1878.**

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*To His Excellency the Right Honorable Sir John Douglas Sutherland Campbell, Marquis of Lorne, one of Her Majesty's Most Honorable Privy Council, Knight of the Most Ancient and Most Noble Order of the Thistle, and Knight Grand Cross of the Most Distinguished Order of Saint Michael and Saint George, Governor General of Canada and Vice-Admiral of the same.*

**MAY IT PLEASE YOUR EXCELLENCY :**

I have the honor to submit the Annual Report of the Department of Public Works, for the year 1877-8, in accordance with the Statute.

**CHARLES TUPPER,**

*Minister of Public Works.*

**DEPARTMENT OF PUBLIC WORKS,**

**OTTAWA,**

**31st December, 1878.**



# REPORT.

1877—78.

---

To the Honorable

CHARLES TUPPER, C.B.,

&c., &c., &c.,

Minister of Public Works.

SIR,

I have the honor herewith to lay before you the Annual Report of the Department compiled in conformity with your instructions.

The report sets forth the transactions and general expenditure with the cost of maintenance of the various Public Works during the fiscal year ended 30th June, 1878.

Appendix No. 1, pages 5-8, shews this expenditure in detail.

The Annual Reports of Superintendents, with general and special Reports from the Departmental Engineers, are given in the Appendices.

The works under the control of the Department are as follows :—

GOVERNMENT RAILWAYS.

TELEGRAPHS.

CANALS.

WORKS ON NAVIGABLE RIVERS.

HARBORS AND PIERS.

SLIDES AND BOOMS.

PUBLIC BUILDINGS.

## RAILWAYS.

The Railways of the Dominion under the direction of the Department, consist of:—

1. The Canadian Pacific Railway.
2. The Intercolonial Railway.
3. The Prince Edward Island Railway.

### CANADIAN PACIFIC RAILWAY.

The Canadian Pacific Railway is projected to commence from a point at or near the south-eastern angle of Lake Nipissing.

Construction has commenced at the River Kaministiquia, Lake Superior, about 3 miles from its mouth. Running in a north-westerly direction the line passes to the north of Lac des Mille Lacs, whence it proceeds to the north of Lakes Wabigoon and Vermilion. The line then passes to the River Winnipeg, which it crosses at Keewatin (Rat Portage,) the point of discharge of the Lake of the Woods. Thence the line proceeds to Selkirk on the Red River. Beyond this point construction has not yet commenced.

#### PEMBINA BRANCH.

Extending southward from the main line at Selkirk to Emerson at the Boundary Line, where it connects with the St. Paul and St. Vincent Railway in the State of Minnesota..... 84½ miles.

The works on the section between Fort William and English River, 113 miles, are so far advanced that rails have been laid to the 102nd mile, and the line ballasted to the 60th mile. [December, 1878.]

The line between English River and Keewatin, 185 miles, has been re-examined, and its location amended. This work is now being placed under contract.

From Keewatin to Cross Lake is 36 miles. This section is under construction. Half of the rock excavation, and a large quantity of earth work has been executed.

On the section from Cross Lake to Selkirk, 76 miles, the grading and bridging is completed. At the eastern end a heavy embankment remains unfinished. It is anticipated that it will shortly be completed. The rails have been laid for 75 miles.

A contract has been given out for the engine house at Selkirk. [December, 1878.]

On the Pembina Branch, 22 miles is completed, viz., from Selkirk to St. Boniface. On the remaining distance, 63 miles, to Emerson, [December, 1878] the rails are laid, but the river crossings have been effected by temporary structures, ultimately to be made permanent. In the ensuing summer the line will be ballasted..

On the Canada Central extension, 120 miles, 37 miles have been located; of this extent 25 miles are under construction, and much of the work performed. The remaining distance has yet to be located. [December, 1878.] This line, extending from Pembroke to Lake Nipissing, is being constructed under a subsidy not to exceed, \$1,440,000.

The Georgian Bay Branch, 50 miles, extends from South River Lake Nipissing to Cantin's Bay, French River. The contract for grading, bridging, track laying and ballasting, was signed 2nd August, 1878. The contractors have done little beyond delivering supplies. [December, 1878.]

In British Columbia in the summer of 1878, the location between Emory's Bar, 5 miles below Yale, and Savona's Ferry at the foot of Kamloops Lake, a distance of 125 miles has been revised and improved. These examinations have established that the River Fraser can be best crossed 6 miles below Lytton. A considerable reduction of cost in the estimates has been effected between Spence's Bridge and Kamloops Lake. The location survey has been carried north of Kamloops Lake, by which the line has been shortened  $3\frac{1}{2}$  miles, the curvature reduced, and the work lightened. (Appendix 21, page 155.)

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## INTERCOLONIAL RAILWAY.

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### LENGTH OF LINE.

---

	Miles.
River du Loup to Moncton.....	374
Moncton to Painsec .....	8
Painsec to Truro .....	118
Truro to Windsor Junction.....	48
Windsor Junction to Halifax.....	14
	<hr/> 562

*Extensions.*

Moncton to St. John.....	89
Painsec to Shediac.....	11
Truro to Pictou.....	52
Windsor Junction to Windsor. ....	32
	<hr/> 184
	<hr/> 746

*Local Branches.*

Rimouski to Wharf.....	2
Newcastle, N.B., to Deep Water Wharf.....	2
Dorchester to Shipping Wharf.....	1
Sackville to Shipping Wharf.....	0.5
Stewiacke to Wharf.....	1
	<hr/> 6.5
Total.....	<hr/> 752.5

The Windsor Branch 32 miles long extending from Windsor junction to Windsor was maintained by the Department, and worked by the Annapolis Railway Company to the 24th September, 1877, when by Order in Council No. 14,181, 25th July, 1877, it was handed over to the Western Counties Railway Company, conditionally on the line of this Company being extended from Annapolis to Yarmouth, a distance of 82 miles, in a stated time.

There being ground to anticipate that these conditions cannot be observed, the question of the re-transfer of the branch is under consideration.

An agreement has been made for the transfer of the Pictou Branch, 51 miles in length to the Halifax and Cape Breton Coal and Railway Company, upon the Company completing the construction of the line from New Glasgow to the Gut of Canso, 82 miles and likewise establishing a ferry between the main shore and the Island of Cape Breton at the terminus of the Railway. The conditions are further that the Pictou Branch, and the line of the Railway Company from New Glasgow to the Gut of Canso be kept in thorough condition and that daily trains be regularly run.

In default the Railway and Ferry shall become the property of the Nova Scotia Government free from incumbrance, under the like condition of equipping and operating the line on a tariff accepted by the Government of the Dominion. In event of failure on the part of the Nova Scotia Government satisfactorily to work the line, the whole property shall revert by the Dominion Government.

According to the Report of Mr. C. J. Brydges, General Superintendent of Government Railways, the following results have been attained :—

The total expenditure on capital account on the entire line, up to the 30th June, 1878, is \$36,091,065.85, against \$35,682,249.11, of fiscal year 1876-77.

The amounts chargeable to capital account for the fiscal year ended 1878, are ;—

For the extension into Halifax.....	\$72,624 07
Deep water terminus at St. John.....	66,452 18
Land at           “           “ .....	33,000 00
Completion of the Intercolonial between River du Loup and Truro.....	101,610 62
Completion of the rolling stock.....	125,245 52
Costs incurred in cases before the Supreme Court	9,843 35
<b>Total.....</b>	<b>\$408,816 74</b>

In 1876-7 the expenditure for renewals amounted to \$543,591.68, and was entered in the Public Accounts, Part III., page 58, under the head of Renewals, Suspense Account. Of that sum \$200,000 was charged to working expenses for renewals in that year; \$200,000 is charged for the fiscal year 1877-8, and the balance, \$143,591.68, will be included in charges for renewals in the account of 1878-9.

The gross earnings of the year have been \$1,378,946.78, being an increase of 19.44 per cent., as compared with last year.

The cost of working the line, with maintenance is \$1,811,273.56, including \$200,000 for renewals, chargeable to 1877-78, from the total expenditure \$543,591.88 made in 1876-7.

The excess of expenditure over revenue is \$432,326.78, against \$507,228.20, the excess of the previous fiscal year.

The loss accordingly is less by \$74,901.42,

The increase of receipts is on the freight traffic, the passenger traffic having been considerably reduced.

The traffic from and to the West with the Lower Provinces has largely increased during the year.

The increase in tonnage carried was equal to 24.63 per cent.



The whole of the line between Halifax and St. John has been laid with steel rails, thus leaving but  $24\frac{1}{2}$  miles on the whole line hereafter to be laid with steel rails. 156,742 new ties were placed throughout the whole line. 16,245 rods of post and pole fence have been constructed.

The necessary repairs to fencing have been made.

It has been found necessary to remove the snow fences further back from the track.

St. Octave snow shed has been increased in length 800 feet.

A new snow shed has been constructed near St. Flavie 1,650 feet long.

There are 65 snow sheds on the line having a total length of  $12\frac{1}{2}$  miles. The total snow fence amounts to  $46\frac{1}{2}$  miles.

The cost of removing snow and ice amounted to \$12,659.58.

The iron lattice bridge at Elmsdale 150 feet span was opened for traffic June, 1877.

The bridge at Rowdon River, consisting of 4 spans of 20 feet has been replaced with iron girders.

The bridges, culverts, cattle-guards, timber floor beams and overhead bridges have been repaired and maintained.

The overhead bridge at Newcastle has been raised.

The passenger station houses with platforms and accessory structures have been kept in repair.

New sidings have been laid to the extent of 17,590 feet, the total number on the ground being 458, with an aggregate of  $85\frac{1}{2}$  miles.

17 stations were furnished with semaphore signals, making a total of 63 supplied.

The total number of engines and carriages is 3,239, being an increase of 37 in the year.

Three new engines were procured last year.

Three engines are under construction.

Cars of various classes are being built.

The engine stock is reported as being worked to its full capacity.

The cars are in sufficient number.

In the interchange of traffic, car mileage is in favour of the line.

In October, 1877, the station buildings at Assametquaghan were destroyed by fire; they have been rebuilt.

The line is reported in good working order, 20 miles only of the distance requiring ballasting. Its condition is in all respects satisfactory.

In the season of navigation on the St. Lawrence, the ocean steamers receive the mail at Rimouski, in winter at Halifax. The mail service has been satisfactorily performed throughout the year.

The cost per train mile is 74.59 cents, a decrease as compared with last year of 7.82 cents. (Appendix 20, page 129.)

#### CASUALTIES.

There have been 49 casualties. (Appendix 20, page 153.)

### PRINCE EDWARD ISLAND RAILWAY.

#### LENGTH OF LINE.

	Miles.
Tignish to Royalty Junction .....	113½
Royalty Junction to Mount Stewart.....	20
Mount Stewart to Georgetown.....	21
	<hr/> 154½

#### EXTENSIONS.

Royalty Junction to Charlottetown.....	5
Mount Stewart to Souris .....	39
	<hr/> 44
	<hr/> 198½

According to the Report of Mr. C. J. Brydges, General Superintendent of Government Railways, the following results have been obtained.

The capital account at the close of the year amounted to \$3,409,919.70, being an increase of \$6,551.86 over the total of last year, caused by the payment for the Bredalbane Station an expenditure incurred prior to the opening of the railway. The

working expenses were \$221,599.49; this amount includes \$27,464.45 for renewal of rails and fencing.

The receipts during the year have been..... \$135,899.60

An increase over the amount of last year of..... 5,234.68

The passenger receipts shew an increase of \$4,653.04, with an increase of 17,95 in the number carried. The decrease in the working expenses has been \$6,995.76.

The loss in working the line has been \$85,699.89, shewing a decrease of \$12,230.4 over last year, which amounted to \$97,930.33.  $4\frac{1}{2}$  miles of steel rails have been laid during the year, making in all  $9\frac{3}{4}$  miles so laid. 19,572 sleepers have been put in the track. The total cost of maintenance has been \$62,928.42, a decrease of \$9,564.8 over last year.

The traffic has increased 9.7 per cent. and the cost of maintenance has decreased 13 per cent.

Repairs have been made to Summerside wharf.

The total length of siding laid during the year has been 0.85 miles, making a total length over the whole line of 10,14 miles.

The sum of \$10,617.48 has been expended generally on fences and snow fences.

The necessary repairs have been made to stations and the accessory buildings, bridges and ballasting and the line generally maintained. (Appendix 19, page 102-127.)

#### CASUALTIES.

The casualties were five in number. (Appendix 19, page 128.)

The steamer "Northern Light," which makes the connection between the mainland and Georgetown, P. E. I. during winter is under the control of the Department of Marine and Fisheries.

## TELEGRAPHS.

The telegraphs of the Dominion comprise :—

1. The Pacific Railway Line of Telegraph.
2. The British Columbia Telegraph System, from Victoria, Vancouver's Island to Cariboo.

### TELEGRAPH, CANADA PACIFIC RAILWAY.

The telegraph line between Fort William and Selkirk, 410 miles, is in use. The line has been constructed from Selkirk to the longitude of Edmonton, 1197 miles, and is in operation to Battleford, 967 miles. In British Columbia the telegraph is ready for use in operation from Cache Creek running easterly to Kamloops, 50 miles. The line is partially cleared 55 miles north of Kamloops. (Appendix 21, page 156.)

### TELEGRAPH, BRITISH COLUMBIA.

The telegraph is in operation as follows :—

	Distance in miles.
From Victoria, Vancouver's Island, to Saanich, V. I.....	15
From Saanich, Vancouver's Island, to Swinomish, Washington Territory, including five submerged cables.....	60
These cables are each $\frac{7}{8}$ of an inch in diameter, with seven conducting No. 19 copper wires, twisted together and insulated with two coverings of gutta percha $\frac{1}{8}$ inch diameter with armour of twelve No. 8 galvanized iron wires. The total length of the cables is $16\frac{1}{2}$ miles. Weight about 5,000 lbs. to the mile.	
From Swinomish to Matsqui, on the River Fraser.....	68
Matsqui to New Westminster, " .....	36
Matsqui to Hope " .....	59
Hope to Yale " .....	14
Yale to Lytton " .....	57
Lytton to Quesnel " .....	271
Quesnel to Barkerville, Cariboo " .....	52

There is also a branch of ten miles from New Westminster to Burrard's Inlet. Constructed by Messrs. Moody & Co.

A break occurred in the submerged cable across Haro Strait.

The land portion of the line is in good order.

The expenditure during the year has been..... \$36,662.94

The revenue..... 8,790.35

(Appendix 18, page 98.)

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### CANALS.

The Canals of the Dominion have been constructed on the following routes of inland navigation :—

1. The River St. Lawrence and Lakes.
2. Fort Frances Canal, Rainy River.
3. The Ottawa, to the City of Ottawa.
4. The Rideau navigation from Ottawa to Kingston.
5. The River Richelieu to Lake Champlain.
6. St. Peter's Canal, Cape Breton, Nova Scotia.

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#### RIVER ST. LAWRENCE AND LAKES.

The navigation extends from the Straits of Belle Ile, by the River St. Lawrence through Lakes Ontario, Erie, St. Clair and Huron to Duluth, at the head of Lake Superior, a distance of 2,384 statute miles.

Lake Superior is about 600 feet above the highest tidal flow of the St. Lawrence, at Three Rivers.

The canals on the route are the Lachine, Beauharnois, Cornwall, Farran's Point, Rapid Plat, Galops and Welland. Their total length is 73.83 miles; total lockage, 536½ feet; number of locks, 54.

The St. Mary Canal is situated on the United States side of the channel, and was constructed under that Government to avoid the St. Mary Rapid. It connects Lakes Huron and Superior. It is 1.07 miles long, and has 18 feet lockage, with a depth of water on the sills of 12 feet.

A new lock is, however, in course of construction which will have 16 feet on the sills at the lowest range of Lake Superior.

A statement of distances, and sections of navigation, from the Straits of Belle Ile to Duluth, at the head of Lake Superior are appended. (Appendix 2, page 9, table A.)

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#### LACHINE CANAL.

Length of canal .....	8½ statute miles.
Number of locks.....	5
Dimensions of locks....	200 feet by 45 feet.
Total rise of lockage.....	44½ feet.
Depth of water on sills { at two locks .....	16 "
{ at three locks.....	9 "
Breadth of canal at bottom.....	80 "
Breadth of canal at water surface.....	120 "

This canal extends from the City of Montreal to the Village of Lachine, overcoming the St. Louis Rapids, the first series of rapids which bar the ascent of the river St. Lawrence. They are 986 miles distant from the Straits of Belle-Ile.

This canal was closed on the 4th December, 1877, and opened on the 8th May, 1878.

The gates throughout have been generally repaired and where necessary the valves, rods and screws refitted.

Locks Nos. 3 and 4 have been generally cleaned and repuddled at the recess walls and partially sheeted with new plank.

The bridges have generally been repaired. The flooring of No. 2 has been renewed.

The bridge at St. Gabriel Lock received some temporary additions to adapt it to the new work, and an additional temporary bridge on bents was constructed.

Extensive repairs were made to Waste Weir at head of Basin No. 2; a new boom 115 feet long was placed in front of this weir.

Some repairs were made generally to weirs at Locks Nos. 3 and 4.

The flour sheds were thoroughly repaired.

The wharves at Basins Nos. 1 and 2 were also repaired, and snubbing posts were placed along the banks.

A new road is under construction on the south-east side of the canal.

The dwelling-houses in the neighbourhood of St. Gabriel Basin have been thoroughly repaired. (Appendix 3, page 11.)

#### NEW WORKS.

The locks on the enlarged canal will be 270 feet between gate quoins and 45 feet wide at bottom.

There are two locks between the Harbor of Montreal and Wellington Bridges, lock one at the harbor entrance, and lock two at the Mill Street crossing, having a depth of 18 feet on the sills. The Canal with its basins between those two points will have a depth of 19 feet. The remaining three locks at St. Gabriel, Côte St. Paul, and Lachine will have a depth of 14 feet on the sills. All permanent structures have their foundations so placed that the prism of the canal may be eventually deepened to 15 feet without disturbing them, should the additional two feet in depth be held desirable.

The two lower locks are connected by a basin 540 feet long with an average width of 260 feet. The basin known as No. 2 Basin has been enlarged at its south-west end. Wellington Basin communicates with Basin No. 2 and extends to St. Etienne Street, Point St. Charles. It is 1,210 feet long and 225 feet wide. A second basin is projected of the same length and depth and 250 feet wide, parallel to it.

From below Wellington Bridge to Côte St. Paul Lock, the new canal will have an average width of 200 feet, and from that lock to Lachine the average width will be 150 feet.

The new locks are located adjoining the old locks as independent structures, and hereafter the canal will be navigable through the double range of locks with double entrances at Montreal and at Lachine.

The work is divided into eleven sections, as follows :

Sections 1 and 2 include two locks with intervening basin, the construction of Wellington Basin and enlargement and deepening of Basin No. 2. Contractors, Messrs. James Worthington & Co.

Most of the masonry has been laid, but little remaining to be done to complete the works. It is anticipated that the dredging in Basin No. 2 will be finished this fall.

Section 3.—From below Wellington Bridge to a short distance above St. Gabriel Lock ; distance, 4,200 feet. Contractors, Messrs McNamee, Gaherty and Fréchette.

The work is rapidly approaching completion, the masonry of Wellington Street Bridge alone being unfinished.

Section 4.—From above Saint Gabriel Lock to above railway bridge ; distance 3,800 feet. Contractors, Messrs. Whitney & Doty.

This section is completed.

Section 5.—From above railway bridge to below St. Paul's Lock ; distance, 4,200 feet. Contractor, Mr. Alphonse Charlebois.

This section consists of excavation and side walls, with the River St. Pierre syphon culvert.

The masonry is finished.

It is anticipated that the dredging will be completed next spring.

Sections 6 and 7.—From below St. Paul's Lock, a distance of 10,000 feet. Contractors, Messrs. William Davis & Sons.

The masonry at Côte St. Paul Bridge is completed and the superstructure placed in position.

The lock walls are finished and the retaining wall at the upper end of the lock is under construction. Four dredges are at work on the excavation. The bridges and gates have been built by day labor under the direction of the Department.

Section 8.—From the end of Section 7 a length of 7,500 feet.

Contractors, Messrs. O'Brien, Sullivan & Co.

Considerable satisfactory progress has been made during the year. The side wall on the north side and about three-quarters of the length on the south side have been built. A puddle wall is under construction in the north bank. Some small culverts are finished and a portion of the berm bank graded.

Section 9.—From the end of Section 8 to below guard lock ; length, 6,000 feet  
Allotted Messrs. John Lyons & Co.

But little work was executed during the past year and the contractor abandoned the work on the 16th March, 1878.\* It became accordingly incumbent on the Department to employ men to place the section in a fit condition for the opening of navigation.

No portion of this section is completed.

Section 10.—From below guard lock to river entrance ; length, 1,400 feet. Contractors, Messrs. Rodgers, Kelly & Co.

Little remains to be done to finish the work.

Section 11.—Forming river entrance and harbour at Lachine ; length, 6,200 feet, Contractors, Messrs. William Davis & Sons.

The whole number of cribs sunk is 244, representing 5,128 lineal feet of continuous crib work. The deepening of the upper portion has been carried on by submarine blasting 4,000 cubic yards having been removed. (Appendix 3, page 14.)

#### BEAUHARNOIS CANAL.

Length of canal.....	11½ statute miles.
Number of locks.....	9
Dimensions of locks.....	200 feet by 45 feet.
Total rise of lockage .....	82½ f. et.
Depth of water on sills.....	9 “
Breadth of canal at bottom.....	80 “
Breadth of canal at water surface .....	120 “

\* This work has since been given to Messrs Williamson, Rodgers & Farrell, 25th Nov., 1878.



This canal commences on the south side of the St. Lawrence,  $15\frac{1}{4}$  miles from the head of the Lachine Canal. It connects Lakes St. Louis and St. Francis, and avoids the three rapids known respectively as the "Cascades," "Cedars," and "Coteau."

This canal closed on the 6th December, 1877, and opened on the 24th April, 1878.

No interruption to traffic occurred.

A house above lock No. 7 has been built for the lock laborers and the bridge tender. Some repairs have also been made to the buildings occupied by the lock master, collector and superintendent.

New gates were hung at locks Nos. 11 and 13. Some repairs were made at the gates at the other locks and pier gates rebuilt. The bridges have been kept in repair. At lock No. 14 the bridge was partially rebuilt. A new bridge has been constructed at Valleyfield. A large number of snubbing posts have been renewed,

Two leaks, one above St. Timothy's Bridge and one at St. Timothy's Weir, were stopped and the damage made good.

The dam at Isle aux chats and the dyke at Hungry Bay were maintained in order. The banks, towing paths, slope walls, wharves and fences have been kept in repair.

The ditches and culverts cleaned. (Appendix 3, page 18.)

#### CORNWALL CANAL.

Length of canal.....	$11\frac{1}{2}$ statute miles.
Number of locks.....	7
Dimensions of locks.....	200 feet by 55 feet.
Total rise of lockage.....	48 feet.
Depth of water on sills.....	9 "
Breadth of canal at bottom.....	100 "
Breadth of canal at water surface.....	150 "

From the head of the Beauharnois to the foot of the Cornwall Canal there is a navigable reach through Lake St. Francis of  $32\frac{1}{4}$  miles.

The Cornwall Canal surmounts the Long Sault Rapids.

The canal was closed from the 8th December, 1877, to the 22nd April, 1878:

The navigation has been uninterrupted.

The gates, weirs and bridges have been repaired; the embankment and slope walls raised, and ditches and drains cleaned out. (Appendix 4, page 32.)

#### NEW WORKS

The work for the new enlargement placed under contract consists of the construction of two locks with regulating weir, and the formation of a new lower entrance. Contractors, Messrs. Gordon, Woodward and Chamberlin.

The entrance channel will be south of the present line, and the centre line of the new locks 300 feet from the present centre line. The water level of the Cornwall reach, between Locks Nos. 17 and 18, will be raised two feet, the descent to the level of the St. Lawrence being by the two locks under construction. Entrance piers will be likewise made.

The entrance piers are under progress and will be completed this fall.

The foundation of Lock No. 1 has been completed, and the walls sufficiently raised to place the work in safety.

Lock No. 2 will be nearly completed at the end of the fall, and will then possibly require but a few courses of masonry.

The supply weirs are finished.

Much of the excavation has been performed.

#### WILLIAMSBURGH CANALS.

The Farran's Point, Rapid Plat and Galops Canals are collectively known as the Williamsburgh Canals.

#### FARRAN'S POINT CANAL.

Length of canal.....	$\frac{3}{4}$ mile.
Number of locks.....	1 "
Dimensions of lock.....	200 feet by 45 feet.
Total rise of lockage.....	4 feet.
Depth of water on sills.....	9 "
Breadth of canal at bottom.....	50 "
Breadth of canal at water surface.....	90 "

From the head of the Cornwall Canal to the foot of Farran's Point Canal, the distance on the St. Lawrence is 5 miles. This canal enables vessels ascending the river to avoid the Farran's Point Rapids. Descending vessels run the rapids with ease and safety.

It was closed 5th December, 1877 ; opened 29th April, 1878.

The navigation was uninterrupted.

The lock gates have been repaired. (Appendix 5, page 33.)

#### RAPID PLAT CANAL.

Length of canal.....	4 miles.
Number of locks.....	2 "
Dimensions of locks.....	200 feet by 45 feet.
Total rise of lockage.....	11½ feet.
Depth of water on sills.....	9 "
Breadth of canal at bottom.....	50 "
Breadth of canal at surface of water.....	90 "

From the head of Farran's Point Canal to the foot of Rapid Plat Canal there is a navigable stretch of 10½ miles. This canal is taken by ascending vessels to avoid the Rapid Plat Rapids. Descending vessels run the rapids safely.

Closed 5th December, 1877 ; opened 29th April, 1878.

The navigation has been uninterrupted.

Some repairs have been made to the locks and gates. (Appendix 5, page 33.)

#### GALOPS CANAL.

Length of canal.....	7½ miles.
Number of locks.....	3 "
Dimensions of locks.....	200 feet by 45 feet.
Total rise of lockage.....	15½ feet.
Depth of water on sills.....	9 "
Breadth of canal at bottom.....	50 "
Breadth of canal at surface of water.....	90 "

From the head of Rapid Plat Canal to the foot of the Galops Canal, the St. Lawrence is navigable for  $4\frac{1}{2}$  miles. This canal overcomes the rapids at Point aux Iroquois, Point Cardinal, and the Galops.

Closed 5th December, 1877; opened 29th April, 1878.

Some of the gates were rebuilt and an ice breaker added to the pier at the head of the canal.

General repairs were made to the banks and booms. (Appendix 5, page 33.)

### WELLAND CANAL.

This canal connects Lakes Ontario and Erie. Its summit level, 8 feet above Lake Erie, is supplied from the Grand River by a navigable feeder. There is a descending branch from the feeder to Port Maitland, Lake Erie, and also descending branches at the River Welland.

#### MAIN LINE FROM LAKE ONTARIO TO LAKE ERIE.

Length of canal.....	27 miles and 1,099 feet.
Pairs of guard gates.....	3
Number of lift locks .....	27
Dimensions of locks.....	$\left\{ \begin{array}{ll} 2 \text{ locks of } 200 \text{ feet by } 45 \text{ feet.} \\ 24 \text{ " } 150 \text{ " } 26\frac{1}{2} \\ 1 \text{ " } 230 \text{ " } 45 \end{array} \right.$
Total rise of lockage .....	330 feet.
Depth of water on sills.....	$10\frac{1}{4}$ "

#### RIVER WELLAND BRANCHES.

Length of canal—Port Robinson Cut to River Welland....	2,622 feet.
“ From Welland Canal to River Welland, via lock at Aqueduct.....	300 "
“ Chippewa Cut to River Niagara.....	1,020 "
Number of locks—One at Aqueduct and one at Port Robinson.....	2
Dimensions of locks.....	150 by $26\frac{1}{2}$ feet.
Total lockage from Welland Canal down to River Welland	17 feet.
Depth of water on sills.....	9 feet, 10 inches.

**GRAND RIVER FEEDER.**

Length of canal.....	21 miles.
Number of locks .....	2
Dimensions of locks.....	{ 1 of 150 by 26½ feet. 1 of 200 by 45 "
Total rise of lockage.....	7 to 8 feet.
Depth of water on sills.....	10½ feet.

**PORT MAITLAND BRANCH.**

Length of canal.....	1½ miles.
Number of locks.....	1
Dimensions of lock.....	185 by 45 feet.
Total rise of lockage.....	8½ feet.
Depth of water on sills.....	11 "

The breadth of the main line of this canal, at present, varies as follows;—

Section.	Distance.	Breadth at bottom.	Breadth at surface
	Miles.	Feet.	Feet.
Dalhousie to Thorold.....	9½	70	110
Thorold to Allanburgh .....	2½	26	66
Allanburgh to Ramey's Bend... ..	12½	50	90
Ramey's Bend to Port Colborne.....	1½	58	58
Port Colborne to outer end of West Pier .....	¾	90	.....
Port Robinson to Chippewa, River Welland.....	8½	.....	200
Dunville navigable feeder... ..	21	26	60 to 70
Port Maitland Branch.....	1½	45	85

It was closed 5th December, 1877; opened 9th May, 1878.

There were three interruptions to navigation; one of a few hours' duration on the 9th August, by the sinking of schooner "G. B. Sloan" in No. 13 level; another on the 17th May, by the bottom of Lock No. 25 being forced up and on 16th June, which lasted 34 hours, caused by a break in the bank between Thorold and Allanburgh.

The water supply has been good during the year.

The sum of \$594.49 has been collected in fines during the year.

Repairs to gates have been made at Locks Nos. 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24, 25, 26, and at Port Robinson and Port Colborne.

The waste weirs at Locks Nos. 1, 2, 5, 11, at Welland and on Division No. 4 have been repaired.

The swing bridges at Locks Nos. 1, 2, 4, 5, 15 and at St. Catharines have been placed in repair.

Repairs have been executed to the buildings at Lock No. 1 and at Collector's Office, Port Colborne; to Lock Tenders' houses at Locks Nos. 1, 10, 15, 17, 18, 19 and 20.

The tow path at Twelve Mile Creek and at Locks Nos. 6 and 25 has been placed in good condition.

The floats at Locks Nos. 4, 8, 10, 12, 13, 14, 16 and 18 were repaired and a new float built at Lock No. 6.

The stationary bridges at Locks Nos. 7, 11, 25, at Marshville, Stromness and on Division No. 4 generally were renewed.

Repairs to the tow path bridges at Locks Nos. 1, 5 and 6 and at Twelve Mile Creek were executed.

Cribs were rebuilt at Locks Nos. 6, 10, 12, 14 and 16.

A temporary bridge upon piles for winter traffic and a new double track swing bridge were built at St. Catharines, and approaches macadamized.

The channel at foot of Lock No. 3 has been widened and deepened.

New gates were put in as follows: One at Lock No. 1 and the head gates at Laurie's Mill; one at Lock No. 8; one at Lock No. 9; two at Lock No. 14; two at Lock No. 18; two at Lock No. 22 and the head gates of millrace and mill at Lock No. 23.

A new culvert was added to Lock No. 7.

Retaining walls were built at Locks Nos. 11 and 18.

A stone wall was added to Lock No. 25.

At Dunville a new brick house for Overseer was erected.

Eleven new gates have been placed in reserve and the canal plant generally increased.

The channel at foot of Lock No. 3 has been deepened and widened.

A semaphore has been set up at Welland.

The bridge known as Quaker's Bridge has been removed to Marlatt's, and there thrown across canal; the approaches have been rebuilt.

The culverts on Divisions Nos. 3 and 4 and Higgins' culvert have been repaired.

In the spring of this year the bottom of the canal proper was cleaned out and with the exception of No. 1, the locks were thoroughly cleaned.

The canal generally is in good repair. (Appendix 6, page 34.)

#### NEW WORKS.

The scheme of the new work is the ultimate establishment of a navigation with locks 270 feet long, 45 feet wide, with 14 feet depth on the sills, the canal having a width of 100 feet at bottom, with a depth of 15 feet, the water supply to be obtained from Lake Erie.

For the present, the depth of the canal between the locks is 13 feet. The locks, which can hereafter be raised with moderate expense, are at present constructed with 12 feet on the sills.

The entrance and other locks not coming within this category are constructed with a depth of 14 feet.

The present line of canal is  $27\frac{1}{2}$  miles; the new line of canal will be  $26\frac{3}{4}$  miles.

The present entrance, Port Dalhousie, has been retained as the outlet, that harbor being easy of access, and affording good shelter to vessels, and being unobstructed by reefs and shoals. Moreover it is open throughout the winter except in extreme weather.

An entirely new line of location has been followed from Port Dalhousie to Allanburgh, a distance of  $11\frac{3}{4}$  miles. From Allanburgh upwards, the old canal is being widened and deepened.

The difference of level between Lakes Ontario and Erie can only be generally stated, as the influence causing the variation in the height of water is not identical in character and in time on the two Lakes. The mean has been determined as  $326\frac{1}{2}$  feet. This height is overcome on the present canal by 25 locks. On the enlarged canal there will be 24 locks.

The new entrance lock at Port Dalhousie is on the eastern bank of the creek.

Lock No. 2 is situated at the mouth of May's Ravine, and this and the succeeding Locks Nos. 3, 4 and 5 constitute a group by which the level of the lower plateau is attained. The interval between the locks is about 1,200 feet.

The distance from Lock No. 5 to Lock No. 6 is about 4,000 feet. Locks Nos. 6 and 7 are about 1,000 feet apart.

Locks Nos. 8 and 9 are near the crossing of the Queenston Road at the St. Catharine's Cemetery.

All the locks up to No. 9 have 14 feet lift.

From Lock No. 4 to Lock No. 11 there is a continuous straight line 4.4 miles in length. Between Locks Nos. 11 and 12 the canal deflects 20 degrees to the west. The succeeding Locks Nos. 12, 13, 14, 15 and 16 are on the same straight line, which is about 4,500 feet in length. After Lock No. 11 the intervals between the locks have been determined so as to admit two of the largest vessels on the route passing with ease.

The rise from Lock No. 11 to Lock No. 24, which takes place in a distance of 14,100 feet, is 196 feet.

The location follows the Niagara escarpment to the ravine behind Thorold and is taken through the dividing ridge to Beaver-dam valley.

Between the locks, where practicable, extensive reserve basins, communicating with each other by weirs, are in course of construction.

The work has been divided into 36 sections, the whole of which are under contract.

The following list sets forth the descriptions of the several sections of the work under contract, and the name of the contractor to whom each section has been assigned.

*Section 1*, includes the works for the extension of Port Dalhousie Harbor and for the enlargement of the present waste-weir and the construction of Lock No. 1.

Contractor, Mr. Patrick Larkin.

*Section 2*. About 2,700 feet in length, between Port Dalhousie and the Catharines, through May's Ravine, including the construction of Locks Nos. 2 and 3.

Contractors, Messrs. Denison, Belden & Co.

*Section 3*. 2,500 feet long, includes formation of Canal Locks Nos. 4 and 5, two regulating weirs, two towing path bridges and supply race.

Contractors. Messrs. Denison, Belden & Co.



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*Section 4*, embraces 3,250 feet formation of canal, the work for the new line of Welland Railway for a distance of 5,944 feet, and the construction of piers and abutments for two swing bridges for the railway and for the road leading to St. Catharines.

Contractors, Messrs. Blake, Bros. & Campbell.

*Section 5*, 3,200 feet in length; includes construction of Locks Nos. 6 and 7, two regulating weirs, two towing path bridges.

Contractor, Mr. Alexander Manning.

*Section 6*, includes 7,000 feet formation of canal, the construction of piers and abutments for swing bridge, Niagara street, St. Catharines, and the abutments and pier for a towing path bridge.

Contractor, Mr. Patrick Shannon.

*Section 7*, extends a distance of 3,075 feet; it includes Locks Nos. 8 and 9, two regulating weirs, two towing path bridges, and the abutments and piers for swing bridge for road between St. Catharines and Queenston.

Contractors, Messrs. Higgins and Sullivan.

*Sections 8 and 9*, included in one contract, embrace the formation of canal for 6,338 feet, the construction of three locks, Nos. 10, 11, 12, three regulating weirs, four bridges over the openings between the side basins and reaches, the construction of abutments and piers for a public road bridge, and a culvert to pass the waters of Ten Mile Creek.

Contractors, Messrs. Cairns, Morse, Hart, & Co.

*Section 10*, 2,107 feet long, includes construction of Locks Nos. 13 and 14, two regulating weirs, the piers and abutments for the towing path bridges, forming basins on west side, and grading approaches to bridge seat formed by the extension of the lower wings of Lock No. 13.

Contractors, Messrs. John Ginty & Co.

*Section 11*, extends 2,250 feet, and includes the construction of two locks, Nos. 15 and 16, a regulating weir, two or more towing path bridges and a culvert under the canal for a public road.

Contractor, Mr. Paul Ross.

*Section 12*, extends 2,115 feet, and includes the channel and basins on the north-western side, the construction of two Locks, Nos. 17 and 18, two regulating weirs and two towing path bridges. It also includes the work for the diversion of the Great Western Railway, including a tunnel under the canal.

Contractors, Messrs. Lobb, Dawson & Murray.

*Section 13*, 2,000 feet in length, includes the construction of two locks, Nos. 19 and 20, two regulating weirs, two towing path bridges, and the formation of basins on the north side of the canal.

Contractors, Messrs. Ginty & Dickey.

*Section 14*, 1,775 feet long, includes construction of Locks Nos. 21 and 22, two regulating weirs, and three towing path bridges, and the formation of channels and basins on the north side of canal.

Contractor, Mr. John Brown.\*

*Section 15*, 2,050 feet in length, to the east of the town of Thorold, includes the formation of the canal, cutting a supply race, forming a new water course for the creek, and the excavation necessary to move the track of the Welland Railway to the westward, the construction of two locks, Nos. 23 and 24, two weirs, piers and abutments for a road bridge with retaining walls.

Contractor, Mr. John Brown.\*

*Section 16*, 3,500 feet long, consists chiefly of clay and rock excavation and the construction of a syphon culvert for Ten Mile Creek, with slope and retaining walls.

Contractor, Mr. John Brown.\*

*Sections 17 and 18*, 7,265 feet in length, between Thorold and Allanburg, include the formation of canal, the construction of a lift-lock, building abutments and piers for two road bridges, the pier and abutments for a bridge to carry the line of the Welland Railway, the works connected with a set of guard gates, two arched culverts, a regulating weir and raceway, towing path and bridges.

Contractor, Mr. Robert J. Campbell.

*Sections 19 and 20*, one mile and a quarter in length, between Thorold and Allanburg, include the enlargement of the canal with the formation of two arched culverts, the construction of abutments and piers for a swing bridge at the road crossing, building a retaining wall, the extension of the north wings of the guard lock to form the abutments for a swing bridge and the construction of a supply weir.

Contractors, Messrs. Haney, Haney & Parry.

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\*Mr. John Brown died 28th June, 1876.

*Sections 21 and 22*, one and nine-tenths miles in length, between Allanburgh and Port Robinson and known as the "Deep Cut." They include lowering of the bottom, to three feet below the level of the mitre sill of Port Colborne Lock, and an increase of width chiefly on the west side.

Contractors, 1. Messrs. R. Mitchell & Co.

" 2. Mr. John Brown.\*

*Section 23*, about one mile in length, includes deepening and widening canal and placing a set of guard gates near the north end of the section.

Contractor, Mr. John Carroll.

*Section 24*, one mile in length, consists chiefly in widening and deepening canal.

Contractor, Mr. Charles F. Dunbar.

*Section 25*, embraces widening and deepening canal, &c., for one mile, the construction of piers and abutments of a new bridge for the Quaker Road.

Contractors, Messrs. Ferguson, Mitchell & Symmes.

*Section 26*, consists principally in widening and deepening the canal for a mile.

Contractor, Mr. John Carroll.

*Section 27*, about 5,600 feet in length, includes the enlargement of the canal in the Town of Welland, the construction of an aqueduct over the River Welland, repairing the greater part of the present lift-lock, removing the abutments of road bridge.

Contractors, Messrs. Hunter, Murray & Cleveland.

*Section 28*, in the aggregate about 4,950 feet in length, embraces the widening and deepening of the canal and the construction of piers and abutments for a swing bridge, and the removal of the present swing bridge.

Contractors, Messrs. Ferguson, Mitchell and Symmes.

*Sections 29, 30, 31 and 32*, between the Junction and Rameys's Bend; include three and three quarters miles of widening the canal about fifty feet on the west bank, and lowering the present bottom from two to three feet throughout.

Contractors, Section 29, Messrs. R. Mitchell & Co.

" " 30, " John Ferguson & Co.

" " 31, 32, Mr. John Brown.\*

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\* Mr. John Brown died 28th June, 1876.

*Section 33*, includes the widening and the deepening of the channel for a distance of one mile, the building of side walls and works for drainage. The removal of material on the southern part of *Section 32*, together with the construction of an inverted syphon culvert for the waters of Lyon's Creek.

Contractor, Mr. Ambrose Clark.\*

*Section 34* extends for a distance of nearly one mile, and includes the widening and deepening of the canal, the construction of abutments and piers for a road bridge, building side walls, cutting back ditches and grading towing path.

Contractor, Mr. Ambrose Clark.\*

*Section 35*. About 2,350 feet in length, includes the widening and deepening of the present canal, constructing a new entrance lock with extended wings to form bridge piers and abutments, cutting a raceway and building a weir, constructing road bridges and grading towing path and roads.

Contractors, Messrs. Hunter, Murray & Cleveland.

*Section 36* embraces the improvement of Port Colborne Harbour, the Lake Erie entrance, including the extension of the west pier about four hundred feet into the Lake and deepening the entrance channel.

Contractor, Mr. Charles F. Dunbar.

The canal is crossed by the Welland Railway, and the Great Western Railway

The Welland Railway will cross by a swing bridge.

A diversion of over a mile of railway has been made to attain this result.

The Great Western Railway will pass under the canal by a tunnel 750 feet in length, situated 1,850 feet to the south of the present crossing to the north-east of Thorold.

The principle of crossing by a swing bridge, both in the interests of the railway and of the canal, was so objectionable that it was decided to pass under the canal.

The line of railway has been diverted to the extent of  $1\frac{1}{2}$  miles, to obtain a fit location.

The locks are all finished with the exception of the one at Thorold, No. 25, which is in a fair way of completion, seven courses of stone having already been laid. The foundation for the tidal lock at Port Colborne will be completed at the close of the season.

Arrangements have been made for the masonry on this lock to commence so soon as the season of 1879 will permit.

\* Mr. Clark died 12th August, 1878.

The canal from Port Dalhousie to Thorold is entirely finished, while that portion from Thorold to Allanburgh is being carried on satisfactorily. It will be completed early next season. The dredging sections between Allanburgh and Welland are nearly completed. The dredging south of Welland as far as Ramey's Bend will be completed by the end of the present season. The rock excavation from Ramey's Bend to the basin at Port Colborne is progressing satisfactorily, and is under such control as in no way to impede navigation. There is reasonable expectation that the whole will be completed according to contract. The rock excavation in the basin at Port Colborne will be completed at the close of the present season.

The supply and reservoir weirs are all completed excepting the one at Port Dalhousie, which will shortly be commenced.

The bridge at Welland is well under way, the centre rest pier and east abutments are entirely finished, arrangements are now being made with regard to the west pier.

The foundation of the aqueduct is being dredged out. It is anticipated that all the necessary excavation for the foundation will be taken out this year; the coffer dam has been commenced and it is anticipated that it will be completed for the southern half at the close of the year, so that the necessary plant may be put in position and the masonry commenced early in the spring of 1879.

The Great Western Railway tunnel under the canal is finished.

The extension of the crib work at Port Colborne is being carried on. It is believed the whole, or nearly so, will be finished at the close of this year.

#### BURLINGTON BAY CANAL.

Length of canal.....  $\frac{1}{2}$  mile.

No locks on this canal.

Average breadth between piers..... 138 feet.

Narrowest " " " ..... 108 "

This canal is cut through the sand bar which separates Burlington Bay from Lake Ontario, and is navigable for vessels drawing ten feet of water. It gives access to the Port of Hamilton, and to the Town of Dundas, *via* the Desjardins Canal.

This canal closed on the 13th December, 1877, and opened 30th March, 1878.

The road across the beach has been improved. It is now much travelled.

The recesses for the ferry have been enlarged, and a new ferry scow provided.  
(Appendix 7, page 1)

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## FORT FRANCES CANAL.

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The design was to construct a canal 800 feet in length and  $36\frac{1}{2}$  feet in width at the narrowest part, with a lock 200 feet in length by 36 feet in width, having 7 feet depth on the sills with entrance guide piers. The ordinary lift of the lock to be  $24\frac{1}{2}$  feet.

It is located near the outlet of Rainy Lake, on the north side of the Grand Falls, being 237 miles from Thunder Bay, Lake Superior, and 215 miles east of Winnipeg.

The canal will connect the 44 miles of navigable water of Rainy Lake with Rainy River and the Lake of the Woods, making a continuous navigation of 200 miles from Kettle Falls to Rat Portage, the point of intersection of the Canadian Pacific Railway. The depth of navigation to be 6 feet, lowest range.

Mr. Sutherland, Superintendent of Works, reports the condition of the work as follows:—

Some boulders require to be removed at the Long Sault Rapids 42 miles below Fort Frances, the only obstruction in the stretch above named.

The obstructions which existed at the Manitou Rapids have been removed. Vessels can freely pass without the least impediment.

The lock is generally completed.

The gates are in course of being framed, some oak timber is however required to complete them. (Appendix 25, page 170.)

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## MONTREAL, OTTAWA AND KINGSTON.

This route extends from the Harbor of Montreal to the Port of Kingston, passing through the Lachine Canal, the navigable sections of the Lower River Ottawa and the Ottawa Canals, to the City of Ottawa, thence by the River Rideau and Canal navigation to Kingston on Lake Ontario—a total navigation of  $246\frac{1}{4}$  miles.

After leaving the Lachine Canal, the works constructed to overcome the difficulties of navigation are:—

The St. Anne's Lock ;  
 Carillon Canal ;  
 Chute à Blondeau Canal ;  
 Grenville Canal ;  
 Rideau Navigation ;

The total lockage is  $533\frac{1}{2}$  feet—( $356\frac{1}{2}$  rise, 177 fall)—and the number of locks 59.

The following table exhibits the intermediate distances from Montreal Harbor:—

Sections of Navigation.	Intermediate Distance.	Total Distance from Montreal.
The Lachine Canal .....	8½	.....
From Lachine Canal to St. Anne's Lock.....	15	23½
St. Anne's Lock and Piers.....	½	23½
From St. Anne's Lock to Carillon Canal.....	27	50½
The Carillon Canal.....	2½	52½
From the Carillon Canal to Chute à Blondeau.....	4	56½
Chute à Blondeau Canal.....	½	56½
From Chute à Blondeau Canal to Grenville Canal.....	1½	58½
The Grenville Canal.....	5½	64
From the Grenville Canal to entrance Rideau Navigation.....	56	120
Rideau Navigation, ending at Kingston.....	126½	246½

#### ST. ANNE'S LOCK.

Length of canal.....	½ mile.
Number of locks.....	1
Dimensions of lock.....	190 feet by 45 feet.
Total rise of lockage.....	3 "
Depth of water on sills.....	{ 6 feet at low water. 7 feet at ordinary high water.

This work, with guide piers above and below, surmounts the St. Anne's Rapids between Ile Perrot and the head of the Island of Montreal, at the outlet of that portion of the River Ottawa which forms the Lake of Two Mountains, 23½ miles from Montreal Harbour.

This lock was closed the 4th December, 1877, and opened the 15th April, 1878.

There has been no interruption to navigation. The repairs made have been unimportant.

#### NEW WORKS.

A channel 1,200 feet in length, 120 feet wide, 10 feet 6 inches deep at low water, has been excavated across the shoal below the lock to deep water; the sides being protected by crib work. The work is nearly completed.

The channel to deep water downwards on the north shore of Ile Perrot is also being deepened. (Appendix 3, page 20.)

### THE CARILLON CANAL.

Length of canal.....	2½ miles.
Number of locks.....	3 (two ascending—one descending.)
Dimensions of locks :—Lift	
Lock, No. 1.....	128 feet x 32½ feet.
Lift Lock, No. 2.....	126½ “ x 32½ “
Guard Lock, No. 3.....	126½ “ x 32½ “
Total lockage.....	34½ feet { 21½ upwards. 13 downwards.
Depth of water on sills.....	6 “
Breadth of canal at bottom.....	30 “
Breadth of canal at water surface...	50 “

This canal overcomes the Carillon Rapids.

From St. Anne's Lock to the foot of the Carillon Canal, there is a navigable stretch of twenty-seven miles, through the Lake of Two Mountains and the River Ottawa.

Closed 5th December, 1877 ; opened 19th April, 1878.

The approaches to Locks Nos. 1 and 3 have been cleared.

A portion of the dam on the south side of the Island in the North River has been rebuilt.

The usual repairs have been made. (Appendix 3, page 21.)

### CHUTE A BLONDEAU CANAL.

Length of canal.....	½ of a mile.
Number of locks.....	1
Dimensions of lock.....	130½ feet x 32 ½ feet at upper end and 36½ feet at lower end.
Total rise of lockage.....	3½ feet.
Depth of water on sills.....	6 “
Breadth of canal at water surface.....	30 “
Breadth of canal at bottom.....	30 “

Between the Carillon and Chute à Blondeau Canals there is a navigable stretch of four miles. The canal is cut through solid rock, and has only one lock. It is only used by vessels going up the river ; all down vessels run the rapids.



Closed 5th December, 1877; opened 19th April, 1878.

The usual repairs have been made.

It is difficult to keep the water in this canal at a sufficiently high level.

The locks and approaches have been thoroughly cleaned.

#### NEW WORKS.

The new works consist of a dam across the River Ottawa,  $\frac{3}{4}$  of a mile above the village of Carillon, 1,800 feet in length, with a timber slide 600 feet long by 120 feet wide; and a canal  $\frac{3}{4}$  of a mile long, with two locks, 200 feet by 45 feet, with 9 feet of water on the sills, having its entrance at Carillon.

The intent of these works is to replace by an enlarged navigation, the Carillon and Chute à Blondeau Canals. The present Carillon Canal ascends 21.9 by two locks, and descends by one lock 13 feet. The Chute à Blondeau Canal by one lock ascends 3.9, giving a total of four locks.

The work in question was awarded to Messrs. R. P. Cooke & Co., and commenced in the summer of 1873. It was carried on until the spring of 1877, when it was discontinued.

At this period the foundation of the upper lock had been laid, and the lock walls brought to about a third of the height; the lower lock had not been commenced. The excavation of the canal proper was proximately completed. The embankment, which consisted of an outer crib by the river, to sustain the thrust of the embankment, with a retaining wall along the canal, backed by three feet of puddle, was laid for a length of wall 1,735 feet and 3,510 feet of crib-work. The foundation of the temporary bulkhead were mostly placed in position. The foundation of the dam proper was laid in the shallow water, and to some limited extent in the deep water, leaving a total length of 600 feet to be executed in deep water.

The crib work piers of the slide have been carried up to two-thirds of the height for the full length, on both sides. The work between the piers has been completed. About 350,000 cubic feet of timber, 160,000 lbs of iron, and about 1,000 yards of cut stone for the locks, with some minor additions, have been delivered.

During the season of 1878 the work was taken possession of by the Department, and a final settlement made with the contractors. (Appendix 3, page 21.)

## THE GRENVILLE CANAL.

Length of canal.....	5 $\frac{1}{2}$ miles.
Number of locks.....	7
Dimensions of locks—Lift Lock No. 5 } Combined {	130 $\frac{3}{4}$ feet x 32 $\frac{1}{2}$ feet.
" No. 6 }	128 $\frac{1}{2}$ " x 32 $\frac{1}{2}$ "
" No. 7 }	128 $\frac{1}{2}$ " x 31 $\frac{1}{2}$ "
" No. 8 }	128 " x 32 $\frac{1}{2}$ "
Locks Nos. 9 and 10, and Guard Lock No 11 .....	200 " x 45 "
Total rise of lockage.....	45 $\frac{1}{2}$ "
Depth of water on sills .....	6 "
Depth of water on sills of locks Nos. 9, 10 and 11...	9 "
Breadth of canal at bottom.....	20 to 30 feet.
Breadth of canal at surface of water.....	25 to 60 "

From the head of the Chute à Blondeau Canal to the foot of the Grenville Canal here is a navigable reach of 1 $\frac{3}{8}$  miles.

This canal is situated about 56 miles below the city of Ottawa, and avoids the Long Sault Rapids.

Closed 5th December, 1877 ; opened 3rd May, 1878.

Ordinary repairs have been made to the combined locks Nos. 5 and 6 and the combined locks Nos. 7 and 8.

The stone paving of Lock No. 8 has been replaced by concrete and the south wall rebuilt.

### NEW WORKS.

The work of improvement was commenced with the design of rebuilding three locks (Nos. 9, 10 and 11) 180 feet by 40 feet in the chamber, with 6 feet on the sills ; further to deepen the canal proper to 6 feet.

In July, 1871, this work was altered in conformity with the recommendation of the Canal Commission, 24th February, 1871. The locks were then established to be 200 feet by 45 feet, with 9 feet on the sills, and the canal to be deepened to 10 feet ; but the deepening of the canal proper was not ordered till 1873.

In 1873 the location of new locks, Nos. 9 and 10, which had been made on the site of the old locks, was altered, and the new locks were established 40 feet south of the old locks, so that the navigation should not be interrupted.

The enlargement of the canal contemplates the construction of locks 200 feet between the gates, and 45 feet between the quoins, with 9 feet of water on the sills, the main channel having a depth of 10 feet, and a main width at bottom of 40 feet, varying at the surface from 50 to 80 feet, with crossing basins constructed at approximate intervals of half a mile.

Of this work, Locks Nos. 9, 10 and 11 are completed. The deepening of the canal to its established width is nearly completed; three crossing basins, with six approaches to locks, the width at bottom being 80 feet, are finished.

The present work under contract, will accordingly be finished early in the season of 1879, but the combined locks, Nos. 5 and 6 and Nos. 6 and 7, remain to be placed under contract.

During the last fiscal year ended June 30th, 1878, the excavation above the guard lock at Grenville has been carried on, the entrance being 50 feet wide at bottom, with a draught of 10 feet.

A retaining wall of dry stone, 5 feet in height, has been built on both sides of the canal for a length of 300 feet.

The excavation for a  $\frac{1}{4}$  mile below the guard lock has been completed.

The rock foundation under the north abutment of the bridge below the guard lock has been sheathed with plank.

The lower approach to Lock No. 10, for a distance of 360 feet, was widened to 40 feet and deepened to 6 feet.

The excavation in the canal, with the exception of the distance between Lock No. 1 and Dewar's Mill, has been completed to a depth of 10 feet. A point of rock dangerous to navigation has been removed. (Appendix 3, page 22.)

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### CULBUTE CANAL.

This canal is west of the route between Montreal and Kingston, being 107 miles above the entrance to the Rideau navigation at Ottawa. Above the City of Ottawa the following rapids are met :—The Chaudiere, the Duchéne, the Chats, the Chenaux, —popularly called the "Snows"—the Portage du Fort, and the Grand Calumet.

The canal is designed to overcome the Culbute and L'Islet Rapids, and is situated in the north channel of the Ottawa. It consists of two combined locks, each 200 feet in length and 45 feet in width, with six feet of water on the sills, having a total lift of from 18 to 20 feet. The dams have a total length of 520 feet. It opens a navigable reach of 80 miles between Bryson, at the head of the Grand Calumet Falls, and the foot of Des Joachims Rapids.

These works were completed on the 11th November, 1876. (Appendix 3, page 23.)

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**CHANNEL BETWEEN BRYSON AND THE LOWER ENTRANCE OF THE CULBUTE CANAL.**

A survey was made to establish the extent of operations required to obtain the necessary depth in this reach. A contract has since been awarded for this work to Mr. John Harvey. It consists of submerged dams in the Grand Calumet Reef at the Flat Rapid and on the Rocher Fendu Channel, and the excavation of the channel through three shoals between Bryson and the Culbute. (Appendix 3, page 23.)

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**RIDEAU NAVIGATION.**

The Rideau navigation connects the River Ottawa at the City of Ottawa with the eastern end of Lake Ontario at Kingston.

Length of navigation.....	126 $\frac{1}{4}$ miles.
Number of locks going from Ottawa to Kingston.	$\left\{ \begin{array}{l} 33 \text{ ascending.} \\ 14 \text{ descending.} \end{array} \right.$
Total lockage.....	$446\frac{1}{2}$ feet. $\left\{ \begin{array}{l} 282\frac{1}{4} \text{ rise, and} \\ 164 \text{ fall.} \end{array} \right.$ at high water.
Dimensions of locks.....	134 by 33 feet.
Depth of water on sills, 5 feet ; navigable depth through the several canals.....	4 $\frac{1}{2}$ feet.
Breadth of canals at bottom.....	$\left\{ \begin{array}{l} 60 \text{ feet in earth.} \\ 54 \text{ feet in rock.} \end{array} \right.$
“ at surface of water.....	80 feet in earth.

The following table gives the distances of the intermediate stations between the Cities of Ottawa and Kingston :—

No. of Station.	Name of Station.	Distance from Ottawa.	Locks.		Dams.			Length of Artificial Canal at each Station, in miles.
			No.	Lift at Low Water.	No.	Length.	Height.	
		Miles.		Rise. Ft. In.		Feet.	Feet.	
1	Ottawa.....	0	8	82 0	3	230 1,320 1,616	18 33 14	4 60
2	Hartwell's.....	4½	2	22 0	.....	100	28	
3	Hogsback.....	5½	2	13 6	1	320	60	
4	Black Rapids.....	9	1	10 0	1	300	12	0-13
5	Long Island.....	14½	3	27 0	3	850	68	0-13
6	Burritt's .....	40½	1	10 6	1	240	14	1 50
7	Nicholson .....	43½	2	15 2	1	500	9	0-50
8	Clowes.....	44½	1	10 6	1	481	16	0-05
9	Merrickville.....	46½	3	25 0	1	150	6	0-33
10	Maitland.....	55	1	4 9	1	270	8	0-13
11	Edmunds .....	59½	1	10 10	1	343	8	0-06
12	Old Slys .....	60½	2	15 6	1	250	20	0-25
13	Smith's Falls.....	61½	4	33 9	2	600	24	0-13
14	First Rapids, or Poonamalie.....	64	1	7 9	1	260	5	1-25
15	Narrows.....	83½	1	4 0	1	600	9	0-06
Total rise at low water .....		.....	.....	292 3	.....	.....	.....	.....
		.....	.....	Fall.	.....	.....	.....	.....
16	Isthmus .....	87½	1	4 0	.....	.....	.....	1-25
17	Chaffey's.....	92	1	12 6	.....	.....	.....	0-13
18	Davis.....	94½	1	9 0	1	300	15	0-06
19	Jones' Falls.....	97½	4	60 0	1	300	60	0-25
20	Brewer's Upper Mills.....	108½	2	19 0	1	200	20	1-75
21	do Lower Mills.....	110	1	14 2	1	200	12	4-25
22	Kingston Mills .....	120½	4	46 8	1	6,042	14	0-25
23	Kingston.....	126½	.....	.....	.....	.....	.....	.....
Total fall at low water .....		.....	.....	165 4	.....	.....	.....	.....
Total.....		.....	47	.....	24	15,472	.....	16-46

The navigation closed at Kingston Mills 1st December, 1877, and opened 1st May, 1878.

At Ottawa navigation closed the 3rd December, 1877, and opened 1st May, 1878.

The summit level of the navigation is at upper Lake Rideau. But several of the descending reaches are also supplied by the waters which have been made tributary to them. The following description gives the sources of supply.

On leaving the summit, the route towards Ottawa passes by the River Rideau, and towards Kingston by the River Cataraqui. The whole duty of keeping the navigation to its level is thrown upon the reserves, given in detail below.

They may be divided into three systems, viz:

1. The summit level supplied by Lake Wolf system. 2. The eastern descending level in Ottawa supplied by River Tay system, discharging into Lake Rideau. 3. The south-west descending level to Kingston, supplied by Lake Devil system, discharging into Lake Mud.

Lake Buck system, discharging into Lake Mosquito, and thence into Lakes Mud and Indian.

Lake Rock system, discharging into Lake Openacon.

Lake Loughboro' system, discharging into Lake Openacon.

Round Tail system, discharging into Lake Cranberry.

The following adjacent waters are totally distinct from the Rideau navigation:—

The River Mississippi, which discharges into the River Ottawa, in the Township of Fitzroy.

The River Napanee, Mill Haven Creek and Lake Collins, which discharge into Lake Ontario.

Navigation was uninterrupted and the water supply good owing to the precautions taken.

Repairs were made to the lock-master's house at Kingston Mills, Jones' Falls, Chaffey's Narrows, Poonamalie, Smith's Falls (detached and combined), and Edmonds'.

The block house at Kingston Mills was repaired.

Repairs to gates were made at Lower Brewer's, Davis, Old Slys, Edmonds, Burritt's, Hogsback and Hartwell.

The swing bridges at Upper Brewers, Narrows, Merrickville, Nicholson's and Mutchmor have been placed in repair.

The dams at Whitefish Dam, Burritt's, Black Rapids and Dow's swamp have been maintained.

New gates were added to the fourth lock at Jones' Falls.

Repairs were executed to the locks at Davis's, Newboro', Smith's Falls (detached and combined), Long Island, Hogsback and Ottawa.

The Manotick bridge was repaired.

Generally the works are in good working order. (Appendix 8, page 42.)

TABLE showing the dimensions of the locks on the present canals in the Montreal, Ottawa and Kingston line of navigation ; also the size of the largest vessel which may pass through them.

Name of Canal.	Dimensions of Locks.			Dimensions of Vessels.			
	Length.	Breadth.	Depth of water.	Length.	Breadth.	Draught of water when loaded.	Tonnage.
Carillon and Grenville...	128	31½	5½	110	28	5	100
Rideau.....	134	32	5	110	31½	4½	250

### RICHELIEU AND LAKE CHAMPLAIN.

This navigation, commencing at Sorel, at the confluence of the Rivers St. Lawrence and Richelieu, forty-six miles below Montreal, and one hundred and fourteen miles above Quebec, continues along the River Richelieu through the St. Ours' Lock to the Basin of Chambly, where it takes the Chambly Canal to St. John's and again follows the River Richelieu to Lake Champlain, of which the Richelieu is an outlet. The distance from Sorel to the Boundary Line is 81 miles.

At Whitehall, the southern end of Lake Champlain, the Champlain Canal is entered, and a connection obtained with the River Hudson, by which the city of New York is directly reached. The distance three hundred and thirty miles is in the territory of the United States.

The following table shows the distances between Sorel and New York :

Sections of Navigation.	Intermediate distance in Miles.	Total Distance.
Sorel to St. Ours' Lock .....		14
St. Ours' Lock to Chambly Canal .....	32	46
Chambly Canal .....	12	58
Chambly Canal to Province Line .....	23	81
Boundary Line to Champlain Canal .....	111	192
Champlain Canal to Junction with Erie Canal .....	66	258
Erie Canal from Junction to Albany .....	7	265
Albany to New York .....	146	411

### ST. OURS LOCK AND DAM.

Length of canal .....	$\frac{1}{8}$ mile.
Number of locks .....	1
Dimensions of lock .....	200 feet by 45 feet.
Total rise of lockage .....	5 feet.
Depth of water on sills .....	7 feet at low water.
Length of dam in Eastern Channel .....	300 feet.
"    "    Western Channel .....	600 feet

At St. Ours', fourteen miles from Sorel, the River Richelieu is divided by a small island into two channels. The St. Ours' Lock is in the eastern channel.

There is a navigable depth of 7 feet between St. Ours' Lock and Chambly Basin, a distance of thirty-two miles.

Closed 5th December, 1877 ; opened 1st April, 1878.

Navigation was uninterrupted.

The lock gates have been repaired and furnished with new chain rollers ; some mooring posts renewed. The water tables have been paved with brick. (Appendix 3, page 20.)

### RIVER RICHELIEU.

A channel 100 feet wide, 7 feet deep, between St. Antoine Village and St. Ours' Lock has been formed. Some boulders have also been removed.

The approaches to the St. Ours' Lock and the Chambly Basin have been dredged to a depth of 7 feet.

The approaches to the wharves at St. Denis have been connected with the main channel by a channel 75 feet wide. (Appendix 3, page 19.)



## CHAMBLY CANAL.

Length of canal.....	12 miles
Number of locks.....	9
Dimensions of locks—	
Guard Lock; No. 1, at St. John's.....	122 feet by 23½ feet.
Lift “ No. 2,.....	124 “ 23½ “
“ “ Nos. 3, 4, 5, 6. ....	118 “ 23 to 23½ feet
“ “ Nos. 7, 8, 9 combined.....	125 “ 23½ feet.
Total rise of lockage.....	74 “
Depth of water on sills.....	7 “
Breadth of canal at bottom.....	36 “
“ “ surface of water.....	60 “

Succeeding the thirty-two miles of navigation between St. Ours' Lock and Chamblay Basin—a natural reservoir formed by the expansion of the River Richelieu—is the Chamblay Canal, which overcomes the rapids between Chamblay and St. John's a distance of 12 miles.

This canal was closed 2nd December, 1877, and opened 1st May, 1878.

Navigation was uninterrupted.

The bridges Nos. 1, 2, 3, 4, 5, 6 and 8 have been repaired; bridge No. 7 renewed.

The by-wash at Wood's Creek and that below Lock No. 6 have been rebuilt. The by-wash at Lapaline's and Fryers replanked and repaired.

The canal, where narrow and shallow, has been widened and deepened for a total distance of 3,000 feet. A watch-house and storehouse have been erected at Chamblay and repairs made to lockmaster's and bridge-keeper's dwellings. (Appendix 3, page 18.)

TABLE showing the sizes of the smallest locks on the canals of the Richelieu and Lake Champlain line of navigation to New York, also the dimensions of the largest vessel which may pass through them.

Name of Canal.	Dimensions of Lock in feet.			Dimensions of Vessel in feet.			
	Length.	Breadth.	Depth of water on sills.	Length.	Breadth.	Draught of water when loaded.	Tonnage.
U.S.—Erie Canal.....	110	18	7	102	17½	6	210
U.S.—Champlain Canal.	97	14	4	89	13½	3½	70
Chamblay Canal.....	118	23½	7	114	23	6½	280

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### ST. PETER'S CANAL.

Length of canal, about 2,400 feet.

Breadth of canal at bottom, 26 feet.

One tidal lock, 4 pair of gates.

Dimensions, 26 by 122 feet

Depth of water on sills, 13 feet at lowest water.

Extreme rise and fall of tide in St. Peter's Bay, about 9 feet.

This work connects St. Peter's Bay, on the southern coast of Cape Breton, Nova Scotia, with the Bras d'Or Lakes. It crosses an isthmus half-a-mile long and gives access to the Atlantic Ocean.

The work of deepening and widening the canal has proceeded satisfactorily.

This canal is to be widened to 48 feet at bottom, with a depth of 18 feet below summer level of the Bras d'Or, with a tidal lock 200 x 48 feet, with wharves and piers. (Appendix 14, page 68.)

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## WORKS ON NAVIGABLE RIVERS.

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### DOMINION RIVERS.

The following rivers are under the control of the Dominion Government:—

The St. Lawrence (to the head of Lake Superior.)

“ Ottawa.

“ St. Croix, New Brunswick.

“ Restigouche, do

“ St. John, do

“ Tidnish, Nova Scotia.

“ Missiguash, boundary line between New Brunswick and Nova Scotia.

“ Fraser, British Columbia.

“ Red, Manitoba.

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## RIVER ST. LAWRENCE.

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### HARBOR OF QUEBEC GRAVING DOCK.

By the Act 38 Vict., Chap. 56, the Quebec Harbor Commissioners were authorized to borrow an amount which, with the sums voted by the Parliament of Canada, or granted by the Imperial Government, will be sufficient to construct a Graving Dock in the Harbor of Quebec.

The location, by Order in Council, dated May, 1877, has been established at Point Levis.

The dock excavations were carried on with the Harbor Commissioners from November till April.

Tenders have been called for the completion of the entire work. (Appendix 22, page 162.)

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### QUEBEC HARBOR IMPROVEMENTS.

The works under construction consist of an embankment 300 feet in width, extending from the ballast wharf near the Custom House to the Gas Wharf, north of St. Paul Street. Likewise a ship channel 150 feet wide with a revetment wall on a concrete foundation extending a length of 3,500 feet. These works form part of the tidal harbour and dock.

The open crib-work on the north side of the embankment is also being placed in position.

The dredging of the deep trench and the ship channel of the ultimate tidal basin is in progress. (Appendix 23, page 162.)

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### REMOVAL OF ANCHORS AND CHAINS, HARBOR OF QUEBEC.

Owing to the serious obstructions to navigation in the Harbour of Quebec, arising from sunken anchors and chains, an Order in Council was passed on the 16th August, 1876, authorising the removal of such obstructions, giving power for the sale of property when recovered, the proceeds to be applied to the expenditure of the improvement. The operations have been attended with success.

The lifting barge was thoroughly repaired at the beginning of the year under the supervision of the Port Warden. The repairs amounted to \$1,191.30.

After an examination for nests of anchors, the barge was placed at the work of raising the steamer "Bidder" sunk some ten years ago in front of the ferry landing at Levis; the whole wreck, comprising boiler and hull, was lifted. Not having been claimed under the provisions of the 5th section of 29 and 30 Vict., chap. 59, it was disposed of as provided by section 2 of 22nd Vic., chap. 31. The sale realised \$150.

The result is a great improvement to the navigation at this spot.

The barge is now occupied in removing the remaining obstructions in the Harbor of Quebec. (Appendix 24, page 165.)

### DEEPENING CHANNEL BETWEEN QUEBEC AND MONTREAL.

By Order in Council, 31st May, 1873, the Harbor Commissioners of Montreal are authorized to perform this work under the direct superintendence of the Department.

The design is to increase the depth of 20 feet attained in 1865, to 22 feet at lowest water, the channel having a width of 300 feet. This work is reported as proceeding satisfactorily.

It has been carried on at Cap Charles, Cap LaRoche, Cap Levrant and its vicinity, Becancourt, Lake St. Peter, Contrecoeur Channel, Pointe Marie, Varennes, Pointe aux Trembles.

The depth is generally 22 feet 6 inches at low water, the channel being increased in width to 400 to 500 feet at the bends and important points. The aggregate quantity of dredging for the last fiscal year is reported to be 1,224,270 cubic yards. (Appendix 22, page 159.)

### CHAIN TUG SERVICE.

A chain tug 112 feet long, 27 feet beam and 7½ feet hold, has been constructed for the purpose of examining the rapids of the St. Lawrence, and hereafter to be used for drilling in the work of deepening the channel of the Galops. Likewise with the design of testing a system of submerged chain towing.

The engines, high-pressure and condensing, have two cylinders of twenty-two inches diameter, and five feet stroke. The links of the chain are 1½ inch iron, tested to a tensile strain of 21 tons. The breaking strain was found to be from 44½ to 46 tons.

The vessel arrived at the Galops Rapids on the 23rd August, 1876, and has been placed on the line of chain and in the berth prepared for her. It has been found practicable to anchor her at the strongest part of the current, in 15 or 16 feet of water, so as to use the steam drills, and effectively to control the movement of the vessel.

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### NEEBISH RAPIDS.

The Neebish Rapids are situated at the foot of Lake George, half way between Bruce Mines and Sault St. Mary, and extend over a length of 1,600 feet.

The design is to obtain a depth of 14 feet 6 inches on a width of 200 feet.

At the close of last season, generally, there was a channel of 100 feet wide at this depth.

Works have been recommenced and are progressing satisfactorily. (Appendix 13, page 64.)

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## HARBORS AND PIERS.

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### ATLANTIC COAST.

#### RIVER WASHADEMOAK.

In Queen's County, N.B.

The river was deepened. (Appendix 14, page 72.)

#### OBOMOCTO.

In the River St. John, N.B., 10 miles below Fredericton. The work being carried on is the construction of a shear dam from the western shore towards the head of Thatch Island. A third of it is now completed. (Appendix 14, page 67.)

#### ST. JOHN.

The breakwater has been completed and accepted. The deep water terminus has been deepened and the remains of three wrecks removed. (Appendix 14, pages 67 and 71.)

#### PARSBORO'.

In the County of Cumberland, N.S., and on the north shore of the Basin of Minas. The pier was restored. (Appendix 14, page 70.)

#### AVONPORT.

On the River Avon which empties into the Basin of Minas, N.S. The works were repaired and strengthened. (Appendix 14, page 69.)

#### BELLIVEAU'S COVE.

In the County of Digby, N.S., four miles south of Weymouth. The works performed, consist of thorough repairs to the breakwaters and additions to the eastern pier. (Appendix 14, page 69.)

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**VICTORIA PIER.**

In King's County, N.S., five miles east of Morden.

The repairs and increase of height to the breakwater have been completed (Appendix 14, page 71.)

**MORDEN.**

Fifty miles east of Digby Gut, on the south shore of the Bay of Fundy, N.S.

The pier has been lengthened 20 feet. (Appendix 14, page 70.)

**CANNING.**

Better known as Pickett's Pier. This breakwater is two miles below the village of Canning, N.S. It was placed in a state of repair. (Appendix 14, page 70.)

**CAMPO BELLO.**

The breakwater commenced in 1873-74 has been completed. (Appendix 14, page 69.)

**YARMOUTH.**

In Yarmouth County, N.S., 20 miles south-west of Halifax

The harbor has received some dredging. (Appendix 14, page 71.)

**METECHAN COVE.**

On St. Mary's Bay 25 miles north of Yarmouth, N.S.

The breakwater has been lengthened. (Appendix 14, page 70)

**LOCKPORT.**

In Shelburne County, and 37 miles from Shelburne, N.S.

The channel was deepened. (Appendix 14, page 71.)

**JORDAN BAY.**

In the County of Shelburne, N.S. Additional protection has been given to the breakwater. (Appendix 14, page 70.)

**MAHONE BAY.**

In Lunenburg County, N. S., 6 miles from Lunenburg.

Dredging was done to the channel in front of the Town. (Appendix 14, page 72.)

**WHITE POINT.**

In Queen's County, N.S., six miles west of Liverpool.

The breakwater has been lengthened and a number of boulders removed. (Appendix 14, page 68.)

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**HALIFAX.**

Some dredging was done off Her Majesty's Naval Yard. (Appendix 14, page 71.)

**KETCH HARBOR.**

In Halifax County, N. S., 16 miles from Halifax.

The inner bar has been dredged. (Appendix 14, page 72.)

**GUYSBOROUGH.**

At the head of Chedabucto Bay, N.S. Dredging was done to the "Stormy Point Patch." (Appendix 14, page 71.)

**COW BAY.**

About 30 miles south east of Sydney, Cape Breton.

The breakwater has been repaired. (Appendix 14, page 70.)

**SYDNEY.**

Cape Breton, 285 miles north-east of Halifax. A portion of the shoal in the harbour was removed by dredging. (Appendix 14, page 71.)

**PORT HOOD.**

Inverness County, Cape Breton.

This work has received some repairs. (Appendix 14, page 70.)

**TRACADIE.**

In Antigonish County, N.S., and on the southern shore of St. George's Bay, about ten miles west of the northern entrance to the Strait of Canso.

The bar received some dredging. (Appendix 14, page 72.)

**MONAIE'S COVE.**

In Antigonish County, N. S., five miles south of Cape George.

A new block has been added to the breakwater and the old work improved. (Appendix 14, page 68.)

**HARBOUR AU BOUCHÉ.**

In Antigonish County, N.S., on St. George's Bay, 30 miles from Antigonish.

A cut through the bar was completed. (Appendix 14, page 72.)

**ANTIGONISH.**

In the County of Antigonish, N.S., 40 miles east of New Glasgow. Some dredging was done to the upper reach of the harbour. (Appendix 14, page 72.)

## PICTOU.

In Pictou County, N.S., on the Straits of Northumberland, and 113 miles north-east of Halifax.

The East River was dredged. (Appendix 14, page 72.)

## RIVER JOHN.

In Pictou County, N.S.

The navigable channel was straightened. (Appendix 14, page 72.)

## RICHIBUCTO.

On the Straits of Northumberland, 40 miles north of Shediac.

The bar at the entrance of the harbor has been dredged. (Appendix 14, page 71.)

## SHIPPAGAN.

In the County of Gloucester, N. B., at the entrance of Bay of Chaleurs, 70 miles from Chatham. The dam and breakwater abandoned in 1876 and resumed in 1878 are in progress. (Appendix 14, page 67.)

## GRAND ANSE.

In County of Gloucester, N.B., and on Bay of Chaleurs, 70 miles from Chatham. The unfinished crib-work was brought to completion. (Appendix 14, page 69.)

## CLIFFTON.

19 miles east of Bathurst Harbor, Bay of Chaleurs, N.B. Two-thirds of the additions of the breakwater have been accomplished. (Appendix 14, page 67.)

## BATHURST.

On the south shore of the Bay of Chaleurs, fifty miles east of Dalhousie, N.B. "Outer" Bar and "Seal" Bar have been reduced by dredging. (Appendix 14, page 71.)

## CHARLOTTETOWN.

Dredging was performed at the "Pownal Wharf," at the Prince Edward Island Railway wharf and at the Rocky Point Ferry. (Appendix 14, page 72.)

## RIVER MONTAGUE.

In Kings County, P.E.I. The channel of this river was improved by dredging, (Appendix 14, page 72.)

## GRAND RIVER.

In Kings County, P.E.I. Dredging is now being executed to the bar. (Appendix 14, page 72.)

## ST. PETER'S BAY.

43 miles west of Fast Point, P.E.I. A breakwater on the western side of the entrance is under construction. (Appendix 14, page 69.)



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**MALPEQUE.**

On the northern shore of Prince Edward Island, 90 miles from East Point and 40 miles from West Cape. The construction of the breakwater is on the eve of completion. (Appendix 14, page 69.)

**SURVEYS.**

Several harbors on the Atlantic Coast have been surveyed. (Appendix 14, page 73.)

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**RIVER ST. LAWRENCE.**

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**MATANE.**

Matane lies on the south shore, 240 miles below Quebec.

An examination was made of the basin and river mouth and arrangements have been entered into for the construction of a landing pier. (Appendix 13, page 57.)

**RIVER BLANCHE.**

This river is situated between the Rivers Tartigoux and Matane, and is 26 miles east of Métis.

Instructions have been given for the pier to be lengthened and the old work taken up to a higher level. (Appendix 13, page 57.)

**BIC.**

On the south shore of the St. Lawrence, 170 miles below Quebec.

Instructions have been given for the survey commenced in 1876 to be completed during the fall. (Appendix 13, page 58.)

**RIVER DU LOUP.**

On the south shore of the St. Lawrence, 108 miles below Quebec.

Arrangements are made for raising the level of the lower end of the wharf and for covering it with plank. (Appendix 13, page 58.)

**RIVER OUELLE.**

On the south shore of the St. Lawrence, 75 miles below Quebec.

The roadway will be covered with plank to protect it from the wash of heavy seas. (Appendix 13, page 58.)

**ST. JEAN, PORT JOLI.**

55½ miles below Quebec on the south shore of the St. Lawrence.

An additional crib has been constructed. The remaining portion of the pier will be strengthened from the fact of its being considered not secure. (Appendix 13, page 58.)

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**L'ISLET.**

On the south shore of the St. Lawrence, 46½ miles below Quebec.

The restoration of this pier is being proceeded with. The work will be completed this fall. (Appendix 13, page 59.)

**ST. THOMAS MONTMAGNY.**

On the south shore of the St. Lawrence, 30 miles by water from Quebec.

A survey has been ordered of these waters. (Appendix 13, page 59.)

**BERTHIER.**

On the south shore of the St. Lawrence, 24½ miles below Quebec.

Some slight additional work will be performed. The restoration of the pier will then be complete. (Appendix 13, page 59.)

**ST. LAURENT.**

On the south shore of the Island of Orleans, about 10 miles from Quebec.

The necessary repairs to the pier have been ordered. (Appendix 13, page 59.)

**RIVER SAGUENAY.**

On the north shore of the St. Lawrence, 120 miles below Quebec.

A survey has been ordered to determine the proper site of a landing pier at St Ann's on the opposite shore of Chicoutimi. (Appendix 13, page 59.)

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**LAKE ONTARIO.**

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**BLACK CREEK.**

In Prince Edward County, and 7 miles south of Picton.

A survey has been ordered to determine the amount of work required to obtain a navigable channel to Milford. (Appendix 13, page 59.)

**PICTON.**

On the Bay of Quinté, 40 miles west of Kingston.

Instructions have been given for the entrance to the harbor to be widened and deepened and a turning basin formed. (Appendix 13, page 60.)

**BELLEVILLE.**

48 miles from Kingston.

Additional dredging has been ordered to portions of this harbor. (Appendix 13, page 60.)

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**TRENTON.**

At the head of the Bay of Quinté, 60 miles from Kingston and 12 miles above Belleville.

A channel was dredged through the shoal at the entrance of the harbor. The approaches to the wharves have also been deepened. (Appendix 13, page 60.)

**WELLER'S BAY,**

This bay extends from 6 miles east of Presqu' Isle Harbor to the west of the peninsula of Prince Edward County.

Instructions have been given for obstructions in the channel to the wharves at Consecon to be examined. (Appendix 13, page 60.)

**NEWCASTLE.**

47 miles east of Toronto.

The harbor has been dredged. (Appendix 13, page 60.)

**PICKERING.**

21 miles east of Toronto.

The western pier will be lengthened and the approaches to the harbor dredged. (Appendix 13, page 61.)

**TORONTO.**

The work of deepening the western entrance is now in progress. (Appendix 13, page 61.)

**BURLINGTON BAY CANAL**

An examination of these waters was made to determine the obstructions which require removal. (Appendix 13, page 61.)

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**LAKE ERIE.**

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**PORT STANLEY**

Is about 85 miles from the entrance to the Welland Canal, 112 miles from Erie, and 85 miles from Cleveland, State of Ohio.

This harbor has been surveyed. (Appendix 13, page 62.)

**RONDEAU.**

At Point Aux Pins, 140 miles above Port Colborne.

The examination ordered has been performed to determine the work required to protect the inner basin from the storms of Lake Erie. (Appendix 13, page 62.)

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## LAKE HURON.

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### BAYFIELD.

Is situated on Lake Huron, 12 miles south of Goderich, in the Township of Stanley.

Dredging to deepen the harbor is now in progress. (Appendix 13, page 62.)

### KINCARDINE.

Is situated at the mouth of the River Penetangore, 31 miles north of Goderich on Lake Huron.

The wharf damaged by a storm in 1876, has been restored and the superstructure throughout brought to a higher level.

The channel has likewise been dredged. (Appendix 13, page 63.)

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## GEORGIAN BAY.

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### COLLINGWOOD.

On Georgian Bay ; the northern terminus of the Northern and the Hamilton and North Western Railways. A survey was made early in the season.

Arrangements are made for the removal of the boulders which are in the channel and for dredging the more shallow reaches in the harbor. (Appendix 13, page 63.)

### MEAFORD.

Eighteen miles west of Collingwood, and 20 east of Owen Sound.

A survey was made of this harbor. (Appendix 13, page 64.)

### OWEN SOUND.

At the mouth of the River Garafraxa.

A survey was made of the harbor.

Dredging will be executed during the season to obtain additional depth. (Appendix 13, page 64.)

### SAULT ST. MARY.

Some boulders were removed to give free access to the wharf. (Appendix 13, page 65.)

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## LAKE SUPERIOR.

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### PRINCE ARTHUR'S LANDING, THUNDER BAY.

Situated on the north coast of Thunder Bay and three miles from the entrance to the River Kaministiquia.

This harbor was surveyed. (Appendix 13, page 65.)

### RIVER KAMINISTIGUIA.

Dredging was continued until the close of the season of 1877.

Work was resumed in the spring of 1878, and is now in progress. (Appendix 13, page 66.)

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## BRITISH COLUMBIA.

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### VICTORIA HARBOR.

The dredging plant has been laid up during the year. (Appendix 18, page 96.)

### RIVER COWICHAN.

An agreement has been entered into to have these waters cleared of the obstructions which consist of drift piles of fallen timber. (Appendix 18, page 96.)

### BEAVER ROCK, VICTORIA HARBOR.

The work of removing this rock is being carried on. (Appendix 18, page 97.)

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## DREDGES.

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The dredges, the property of the Department, are as follows:

### ON THE ATLANTIC COAST.

#### *Elevator Dredges.*

"Canada."

"St. Lawrence."

#### *Dipper Dredges.*

"New Dominion," with 11 scows.

"Cape Breton," with 7 scows.

"Prince Edward," with 4 scows.

### SAINT LAWRENCE CANALS.

#### *Dipper Dredges.*

"Queen of Canada," with 2 scows.

"No. 1," with 2 scows.

## ON THE LAKES.

*Dipper Dredge.*

One dredge, tug and 3 scows.

## BRITISH COLUMBIA.

*Dipper Dredge.*

One dredge.

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## SLIDES AND BOOMS.

The Government slides were constructed to effect the passage of timber, where impediments to navigation exist, and where no canal connects the reaches of natural navigation. The booms form artificially closed bays at the entrance and discharge of the slide, to retain the timber.

The lumbering districts on which Government works have been constructed are situated on the Saguenay, St. Maurice, Ottawa, Trent, Georgian Bay, and their tributaries.

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## RIVER SAGUENAY.

The works on this river consist of one slide 5,840 feet in length, with a boom of 1,314 feet, and dams, piers and bulkhead. The slide takes the timber past the rapids between Lake St. John and the River Saguenay.

The works extend over a distance of about six miles, and are constructed on *La Petite Décharge*, the less of the two affluents of Lake St. John. Commenced in 1856, they were completed in 1860.

Some repairs have been made to the slide

The works are in good order. (Appendix 12, page 56.)

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## RIVER ST. MAURICE.

The slides and booms on this river and the Vermillion, one of its tributaries, are met in the order here given :

Stations.	From Three Rivers.
<i>River St. Maurice :—</i>	
Booms at mouth.....	0 miles.
Grés Falls.....	16 "
Shawenigan .....	20 "
Grand Mère.....	29 "
Little Piles.....	31½ "
La Tuque.....	100 "
Plamondon Eddy.....	106 "
<i>River Vermillion :—</i>	
Mouth of River.....	116 "
Iroquois Falls .....	121 "

The principal tributaries of the River St. Maurice are the Shawenigan, Mekinak, Matawan, Petit Bostonais, Grand Bostonais, Croche, Vermillion, Tranche, Grand Pierliche and Manouan.

### BOOMS AT MOUTH.

Seventeen piers were raised.

### SHAWENIGAN.

The renewal of old boom and the reconstruction of portions of the slide are now in progress.

### GRAND'MÈRE.

A dam across the entrance of former slide is being proceeded with.

### IROQUOIS FALLS.

These works have been given over to the care of the lumber merchants.

### LA TUQUE.

These works have been abandoned.

The booms were never placed so early as this spring. (Appendix 11, page 52.)

## THE OTTAWA DISTRICT.

The Government works for the descent of timber in the Ottawa district are as follows :—

On the Ottawa, main river.....	11 stations.
“ Gatineau.....	1 “
“ Madawaska.....	15 “
“ Coulonge.....	2 “
“ Black.....	1 “
“ Petewawa.....	31 “
“ River du Moine.....	12 “

The following is a table of distances from St. Anne's Lock at the outlet of the River Ottawa to the mouth of its principal tributaries; also to the stations where alides or other works have been constructed :—

PLACES.	DISTANCES FROM ST. ANNE
Carillon.....	27 miles.
Grenville.....	40 "
River Nation.....	63 "
River Lièvre.....	79 "
" Gatineau.....	96 "
Chaudière Falls.....	98 "
Little Chaudière.....	100 "
Remous.....	102 "
Lac Deschênes.....	105 "
River Quio.....	129 "
Chats Station.....	131 "
Head of Chats.....	134 "
River Mississippi.....	134 "
" Madawaska.....	136 "
" Bonnechère.....	148 "
Les Chenaux.....	152 "
Portage du Fort.....	156 "
Mountain Station.....	161 "
Calumet.....	163 "
River Coulogne.....	184 "
" Black.....	193 "
" Snake.....	204 "
" Petewawa.....	218 "
Les Joachims.....	236 "
River du Moine.....	244 "
Rocher Capitaine.....	253 "
Deux Rivières.....	265 "
River Matawan.....	286 "
" Antoine.....	293 "
" Beauchêne.....	315 "
" Porc-épic.....	326 "
" Grand Opemiconne.....	333 "
" Keepawa.....	349 "
" Montreal.....	355 "
Fort Temiscamingue.....	367 "
River Ottortail.....	384 "
" Blancho.....	386 "
" des Quinze.....	389 "





The dam at Portage du Fort and at Rocher Capitaine repaired and a new one erected at Des Joachims.

Some loose stone forming obstructions in the slide were removed at Calumet and Rocher Capitaine.

The gate-keeper's house at Ottawa was repaired. (Appendix 10, page 49.)

### RIVER GATINEAU.

The River Gatineau flows from the north, and discharges into the Ottawa at a point about 96 miles above the junction of that river with the Saint Lawrence, and 2 miles below the City of Ottawa. The length of the Gatineau is 400 miles, and it drains an area of about 9,000 square miles.

The Government works are centred at one station, about a mile from its confluence with the Ottawa.

They consist of:—

- 3,071 lineal feet of canal,
- 4,138 " " booms,
- 52 " " bridge,
- 10 piers,
- 1 slide-keeper's house.

The works have been maintained in the usual manner and new guide booms for drift wood placed in position. (Appendix 10, page 51.)

### RIVER MADAWASKA.

The length of the River Madawaska is 240 miles. It drains an area to the south of about 4,100 square miles, and discharges into the River Ottawa 136 miles above St. Anne.

Slide and boom stations on the Madawaska, numbered from the mouth of the river upwards, are as follows:—

- |                     |                      |
|---------------------|----------------------|
| 1. Mouth of River.  | 9. High Falls.       |
| 2. Arnprior.        | 10. Ragged Chute.    |
| 3. Flat Rapids.     | 11. Boniface Rapids, |
| 4. Balmer's Island. | 12. Duck's Island.   |
| 5. Burnstown.       | 13. Bailey's Chute.  |
| 6. Long Rapids.     | 14. Chair Rapids.    |
| 7. Springtown.      | 15. Opeongo Creek.   |
| 8. Calabogie Lake.  |                      |

The works at these stations consist of:—

1,750 lineal feet of slides,  
 18,179 " booms,  
 4,080 " dams,  
 182 " bridges,  
 43 piers,  
 1 slide-keeper's house,  
 1 work shop.

The works have been maintained. (Appendix 10, page 51.)

### RIVER COULONGE.

The river drains an area of 1,800 square miles, and its length is 160 miles. It discharges into the River Ottawa, 184 miles above St. Anne, on the north shore.

The following is a list of the Government works on this river:—

Boom at mouth.....	300 feet long and 1 support pier,
Booms at Romain's rafting-ground	400 " 3 "
Booms at head of High Falls slide.	1,848 " 6 "

The works have been repaired. The planking of the slide has been renewed. (Appendix 10, page 51.)

### BLACK RIVER.

This river empties into the Ottawa at a point 193 miles above St. Anne. Its length is 128 miles, and the area to the north drained by it is about 1,120 square miles.

The works consist of:—

1,139 lineal feet of single-stick boom.
873 " slide.
346 " glance pier.
135 " flat dam.

## RIVER PETEWAWA.

The length of the Petewawa is about 138 miles, and the area of the territory drained by it covers 2,200 square miles.

It flows from the south, and discharges into the Ottawa 218 miles above St. Anne. Seven miles from its mouth the Petewawa separates into two branches. On these seven miles there are five stations, on the north branch eighteen stations, and on the south branch eight stations.

List of the slides and booms on this river, in the order in which they occur from the mouth upwards:—

- |                        |                 |
|------------------------|-----------------|
| 1. Mouth of the River. | 4. Third Chute. |
| 2. First Chute.        | 5. Bois dur.    |
| 3. Second Chute.       |                 |

### NORTH BRANCH.

- |   |  |
|---|--|
| 1. Half-mile Rapid.                     | 11. Devil's Chute.                                   |
| 2. Crooked Chute.                       | 12. Elbow of Rapids.                                 |
| 3. Between High Falls and Lake Traverse | 13. Foot of Long Sault.                              |
| (a slide and series of dams and booms.) |  |
| 4. Thompson's Rapids.                   | 14. Middle of Long Sault.                            |
| 5. Sawyer's Rapids.                     | 15. Head of Long Sault.                              |
| 6. Meno Rapids.                         | 16. Between Long Sault and Cedar Lake (south shore.) |
| 7. Below Trout Lake.                    | 17. Between Long Sault and Cedar Lake (north shore.) |
| 8. Strong Eddy.                         | 18. Cedar Lake.                                      |
| 9. Cedar Islands.                       |  |
| 10. Foot of Devil's Chute.              |  |

### SOUTH BRANCH.

- |                  |                   |
|------------------|-------------------|
| 1. First slide.  | 5. Fifth slide.   |
| 2. Second slide. | 6. Sixth slide.   |
| 3. Third slide.  | 7. Seventh slide. |
| 4. Fourth slide. | 8. Eighth slide.  |

The works at these 31 stations are as follows:—

### ON THE MAIN RIVER.

2,963	lineal feet of slides,
8,469	“ booms,
2,077	“ dams,
7	piers.

## ON THE NORTH BRANCH.

480	lineal feet of slides,
2,671	" booms,
1,131	" dams,
23	piers.

## ON THE SOUTH BRANCH.

2,134	lineal feet of slides,
388	" dams.

The booms of the long slide have been repaired, and the piers generally maintained. (Appendix 10, page 50.)

## RIVER DU MOINE.

The length of this river is 120 miles, and it drains to the north an area of about 1,600 square miles. It flows into the River Ottawa at a point about 256 miles above St. Anne.

The present works on this river consists of a pier and retaining boom at its mouth, a single-stick slide, and a series of flat dams from the mouth upward. They may be detailed as follows, viz :—

300	lineal feet of slide,
800	" booms,
1,324	" dams,
6	piers.

The breaking of the boom has been made good.

A small sand bar has been removed. (Appendix 10, page 50.)

## RIVER TRENT AND NEWCASTLE DISTRICT.

The Trent navigation extends from Trenton on the Bay of Quinté to Fenelon Falls at the north extremity of Sturgeon Lake in the one direction, and following to the south-west on the opposite route passes by the River Scugog into the Lake of that name and continues to Port Perry at the head of the Lake. The distance between the mouth of the Trent and Lindsay on the River Scugog is 161½ miles. Of this distance 34½ miles is not navigable for vessels drawing 5 feet of water. The distance from Lindsay to Port Perry at the head of Lake Scugog is 28 miles.

From the mouth of the Trent to Nine Mile Rapids, a distance of 9 miles, there is no navigation. The dam previously placed there in 1844 is now decayed and useless.

From Nine Mile Rapids to Myersburgh, formerly known as Percy's Landing, there is a distance of  $19\frac{1}{2}$  miles with 5 feet of water. A broken navigation for  $14\frac{1}{2}$  miles succeeds to Heeley's Falls. A reach of navigation 5 feet deep follows by the River Trent and Rice Lake ascending the River Otonabee to Peterboro', a distance of  $51\frac{1}{2}$  miles. The navigation is broken from Peterboro' to Lakefield, a distance of  $9\frac{1}{2}$  miles. A reach of navigation is obtained through Clear Lake to Burleigh, a distance of 12 miles, where the Burleigh Rapids, extending over a distance of 1 mile, are met. An open navigation is then taken to Buckhorn Rapids for 7 miles, at which point the navigation is broken for a mile.

The navigation from this point is open to Lake Buckhorn and Lake Chemong to Bridgenorth : to Lake Buckhorn, Lake Pigeon and Lake Ball to Bobcaygeon, thence by Lake Sturgeon and the River Fenelon to Fenelon Falls, and by the River Scugog to Lindsay and thence by Lake Scugog to Port Perry.

The following table gives the distance of navigable and unnavigable reaches :

	Navigable.	Unnavigable.
From Trenton, Bay of Quinte, to Nine Mile Rapids...		9
“ Nine Mile Rapids to Percy Landing..... ..	$19\frac{1}{2}$	
“ Percy Landing to Heeley's Falls Dam..... ..		$14\frac{1}{2}$
“ Heeley's Falls Dam to Peterboro'..... ..	$51\frac{1}{2}$	
“ Peterboro to Lakefield..... ..		$9\frac{1}{2}$
“ Lakefield to Burleigh..... ..	12	
“ Burleigh Rapids..... ..		1
“ Burleigh Rapids to Buckhorn Rapids..... ..	7	
“ Buckhorn Rapids .....		1
“ Buckhorn Dam to Lindsay..... ..	$36\frac{1}{2}$	
	<hr/>	<hr/>
	$126\frac{1}{2}$	$34\frac{1}{2}$
“ Lindsay to Port Perry at the Head of Lake Scugog	$28\frac{1}{2}$	
	<hr/>	<hr/>
	$155\frac{1}{2}$	$34\frac{1}{2}$
Total distance Bay of Quinte to Port Perry. 190 miles.		
Passing to Fenelon Falls the distance from Buckhorn		
Dam to Fenelon is..... ..		$31\frac{1}{2}$

The following works are now in operation :

*Chisholm's Rapids.*

Distance from  
Trenton in Miles.

The Lock at present is unfit for use but with moderate expenditure could be placed in operation. Owing to the Lock being in this condition the navigation at this point is interrupted..... 15

*Percy Landing.*

There is a retaining boom for saw logs now used..... 28½

*Campbellford.*

The guide booms are in use..... 31½

*Middle Falls.*

The works consist of 4 dams and 2 slides which are effective for the passage of timber..... 37½

*Crow Bay.*

The retaining boom is used for logs..... 38

*Heeley's Falls.*

A dam and 1 slide are in operation here..... 42½

*Cook's Rapids, Hastings.*

The works which consist of 1 lock 1 dam and 1 slide for timber are effective..... 34½

*Whitlaw's Rapids.*

Below Peterboro'. The lock, dam and canal are in operation. 92½

*Little Lake.*

Three piers and 1 boom which are effective..... 94

*Buckhorn Rapids.*

This dam is important in keeping to a high level the water of the lakes west of it as far as Bobcaygeon including Lakes Pigeon, Ball, Buckhorn and Chemong. The dam is effective..... 125

*Bobcaygeon.*Distance from  
Trenton in miles.

There are 2 dams here with canal, lock and slide. The dams keep up the level of Fenelon Falls and to the reach as far as Lindsay Lock..... 140½

*Fenelon Falls.*

A large slide and booms which are effective..... 155½

*Lindsay.*

The old lock, owing to dilapidations having become useless, was rebuilt by the Provincial Government. Its dimensions are 134 x 34 feet with 5 feet water on the sills. The navigation is, by this work, extended to Port Perry, Lake Scugog..... 161½

The dimensions of the Dominion locks are 133 feet 6 inches x 33 feet with 5 feet depth of water on the sills.

In 1855 a portion of the above named works were transferred to a committee of gentlemen connected with the lumber trade. The Committee was authorized to collect tolls on timber passing through. The works so transferred, at this date, are the slides and booms at Chisholm's Rapids, the retaining boom at Myersburgh, the guide boom at Campbellford, the dams and slide booms at Middle Falls, the retaining boom at Crow Bay and the slide at Heeley's Falls.

These works are kept in repair by the Committee.

The remaining works of this navigation are under the control of the Department excepting the Lindsay lock constructed in 1870 by the Province of Ontario.

During the past season the following works have been executed :—

*Fenelon Channel.*

The slide, piers and booms at this station have been repaired.

*Bobcaygeon.*

A portion of the bottom of the locks was renewed. A new swing bridge was constructed cross the canal.

*Buckhorn.*

At this station the slide was extended about 30 feet ; the dam was gravelled.

*Little Lake.*

New chains were placed to booms. Two of the piers refilled with stone.



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*Whitlaw's Rapids*

The lock, dams, piers, guide and guard booms have received some repairs.

*Hastings.*

Some boulders have been removed below the lock, and the channel about two miles below the lock has been deepened. (Appendix 9, page 45.)

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**LANDS AND LEASES.**

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A statement of full detail is given (Appendix 16, pages 80-87) of the water power and other property on the canals, leased by the Department during the fiscal year, and of all property purchased and sold, setting forth the names of the parties interested, the price paid, and the circumstances under which each transaction took place; likewise of the property declared to be no longer under the control of the Department.

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**ARBITRATIONS.**

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During the year 104 claims 20 of which were for expropriation of land were referred to arbitration. The amounts claimed and the amounts offered in expropriation cases aggregated \$360,919.64, and the sum awarded was \$309,355.91. (Appendix 17, page 90.)

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**PUBLIC BUILDINGS.**

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**DORCHESTER.****GENERAL PENITENTIARY FOR THE MARITIME PROVINCES.**

The building is proceeding satisfactorily. (Appendix 15, page 73.)

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**SAINT JOHN.**

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**MILITARY STOREHOUSE.**

The building burned in 1877 has been rebuilt. (Appendix 14, page 63.)

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## QUEBEC.

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### FORTIFICATIONS.

Designs for two new gates to be named Kent Gate and St. Louis Gate have been made. The work will at once be commenced.

These additions form part of what is known as the Dufferin Improvement. A contribution from Her Majesty the Queen and the Imperial Government has been granted towards the Kent Gate, named after Edward Duke of Kent.

Extensive repairs to the fortifications have been made. (Appendix 15, page 77.)

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## MONTREAL.

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### EXAMINING WAREHOUSE.

The contract works have been completed. The building is partly occupied.

Engines, boilers and hoisting machinery are being built. (Appendix 15, page 76.)

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## ST. VINCENT DE PAUL PENITENTIARY.

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Extensive additions to the Penitentiary proper are in progress. (Appendix 15, page 76.)

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## ST. JOHN'S ON THE RICHELIEU.

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### POST OFFICE, CUSTOM HOUSE AND CANAL OFFICE.

This building which has a frontage of 52 feet 6 inches on Richelieu Street, is now in progress. (Appendix 15, page 77.)

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## OTTAWA.

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### PARLIAMENT BUILDINGS AND GROUNDS.

The walls, ceilings of entrance hall, and of corridors and adjoining offices of the Parliament Buildings have been colored in distemper. Staircases to the deck have been fitted up. An iron staircase to connect the first floor with the attic is under construction. The extension of the Western Block was sufficiently advanced to admit of its being occupied last January. Several of the old rooms have been refitted. The grounds have been graded and sodded where that work was left unfinished; "Lovers' Walk" has been repaired and some fencing placed where required.

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**RIDEAU HALL.**

A gasometer has been erected and an engine house with engine and boiler appended.

The usual repairs have been made. (Appendix 15, pages 74, 75.)

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**KINGSTON.**

The new block for the Military College is completed and has been fitted up with a new steam apparatus. Roads have been formed and trees planted on the grounds. Some repairs and alterations to the old buildings and fortifications have been made. (Appendix 15, page 75.)

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**GUELPH.**

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**POST OFFICE, CUSTOM HOUSE AND INLAND REVENUE OFFICE.**

This building has been completed and is occupied. (Appendix 15, page 76.)

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**BATTLEFORD, NORTH-WEST TERRITORIES.****OFFICIAL RESIDENCES.**

These buildings are reported to be completed and occupied. (Appendix 15, page 78.)

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**WESTMINSTER, BRITISH COLUMBIA.**

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**PENITENTIARY.**

The building is complete, the dam constructed, a water supply and the greater portion of the fittings and furniture provided. (Appendix 18, page 95.)

**PUBLIC BUILDINGS, BRITISH COLUMBIA.**

The buildings generally have been repaired. (Appendix 18, page 99.)

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**CROSSING FROM MAINLAND TO PRINCE EDWARD ISLAND.**

**An examination has been ordered on both sides of Northumberland Straits of the shore on the mainland adjoining Cape Tourmentine and at Pugwash, and likewise at Wallace Bay; and on the Prince Edward Island shore at Cape Traverse and its vicinity, to determine the most feasible means of establishing a crossing which can be made in all seasons.**

I have the honor to be, Sir,

Your obedient servant,

T. TRUDEAU,

*Deputy  
of the  
Minister of Public Works.*



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ANNUAL REPORT

OF THE

MINISTER OF PUBLIC WORKS

FOR THE FISCAL YEAR JULY 1st, 1877 TO 30th JUNE, 1878.

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APPENDICES.

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## APPENDIX No. 1.

STATEMENT showing the amount Expended by the Department of Public Works,  
Dominion of Canada, during the Fiscal Year ended 30th June, 1878.

Name of Work.	Construction.	Repairs.	Staff and Maintenance.
	\$ cts.	\$ cts.	\$ cts.
<b>CANALS.</b>			
Lechue .....	1,484,619 63	13,646 41	39,062 97
Beauharnois .....		9,861 05	14,383 87
Cornwall .....	145,015 45	4,935 21	13,825 50
Williamsburgh .....		4,449 78	7,430 11
St. Lawrence .....	5,670 46		
Welland .....	2,135,817 99	66,393 53	60,138 59
do damages .....	2,575 00		
St. Anne's Lock .....	14,618 85	541 95	2,057 32
Burlington Bay .....		1,278 06	
Carillon and Grenville .....		5,082 72	11,401 30
Carillon Canal and Dam .....	22,676 20		
Osborne Rapids Lock .....	5,933 53		
Rideau .....		11,034 22	26,651 51
St. Ours Lock .....		283 77	1,656 65
Chambly .....		6,022 96	10,413 99
St. Peters .....	26,511 51		600 00
Canals generally .....			556 00
<b>SLIDES AND BOOMS.</b>			
Saguenay .....		597 60	882 85
St. Maurice .....		6,232 87	12,759 50
Ottawa .....		4,556 98	19,906 37
Newcastle .....	591 28	5,963 11	2,366 45
<b>HARBOURS AND PIERS.</b>			
<i>Ontario.</i>			
Bayfield .....	2,045 57		
Belleville .....	2,000 00		
Cobourg .....	6,533 31		
Kincardine .....	9,421 46		
Meaford .....		250 00	
Napanee .....	1,499 68		
Neesh Rapids .....	8,000 00		
Newcastle .....	5,000 00		
Pictou .....	1,500 00		
Port Burwell .....	1,459 40		
Toronto .....	6,139 68		
Trenton .....	4,139 06		

## APPENDIX No. 1.—Continued.

Name of Work.	Construction.	Repairs.	Staff and Maintenance.
	\$ cts.	\$ cts.	\$ cts.
<b>HARBOURS AND PIERS.—Concluded.</b>			
<i>Quebec.</i>			
Berthier Pier .....		4,106 89	
L'Islet Pier .....		14,240 28	
Quebec Harbour Improvement .....	75,000 00		
St. Jean Port Joli .....		2,000 00	
River Richelieu .....	4,351 12		
River St. Lawrence, removal of chains and anchors do deepening between Quebec and Montreal .....	12,000 00 130,000 00		
<i>New Brunswick.</i>			
Campo Bello .....	1,000 00		
Clifton .....	4,565 75		
Grande Anse .....	1,000 00		
Shippegan .....	1,042 00		
St. John .....	80,155 05		
St. John River .....	2,903 15		
<i>Nova Scotia.</i>			
Antigonish .....	3,649 15		
Avonport .....		500 00	
Belliveau Cove .....	3,000 00		
Canning .....		500 00	
Cow Bay .....		7,343 87	
Ingonish, South .....	51 50		
Jordan Bay .....	2,000 00		
Meteghan Cove .....	3,000 00		
Mabou .....		1,524 42	
Morden Pier .....	1,500 06		
McNair's Cove .....	4,550 50		
Parrsboro' Pier .....		975 42	
Port Hood .....		777 53	
Victoria .....	1,000 00		
White Point .....	3,500 00		
<i>Prince Edward Island.</i>			
Colville Bay (Souris) .....	28,759 38		
Malpeque .....	9,281 80		
St. Peter's Bay .....	1,754 30		
Tignish .....	320 09		
<i>British Columbia.</i>			
Victoria Harbour, removal of Beaver Rock .....	4,480 00		
Cowichan River .....	89 75		
<i>Miscellaneous.</i>			
Dredge Vessels .....	1,860 00		
Dredging, Ontario and Quebec .....	13,740 69		
do Maritime Provinces .....	61,297 86		
do British Columbia .....	541 64		
Surveys .....			27,504 74
Arbitrations and Awards .....			6,883 85

## APPENDIX No. 1.—Continued.

Name of Work.	Construction.	Repairs.	Staff and Maintenance.
	\$ cts.	\$ cts.	\$ cts.
<b>ROADS.</b>			
Metapediac .....		500 00	
Red River Route. ....			3,547 21
<b>PUBLIC BUILDINGS.</b>			
Generally.....			8,886 99
Fort Wellington Barracks, Ontario.....		564 30	
Guelph Custom House, &c do .....	13,788 26		
Hamilton Custom House do .....		208 89	
do Post Office do .....		1,363 81	
Kingston Custom House do .....		256 44	
do Immigrant Shed do .....		45 31	
do Military School, &c. do .....	64,286 22		
do Penitentiary do .....		4,778 52	
do Post Office do .....		89 34	
London Custom House do .....		4,061 26	
do Military Grounds do .....		1,928 33	
do Post Office do .....		47 00	
Ottawa do .....	6,971 83		
do Parlt. and Dept. Buildings do .....	170,120 01	78,441 18	
do do Trophy Paris Exhibition.. ..		12,268 87	
do Post Office and Rideau Hall, water, Ontario..			6,750 00
do Parlt. and Dept. Buildings, gas do ..			20,519 00
do do heating do ..			35,006 07
do do removal of snow do ..			779 00
do Rideau Hall Ontario.....		36,951 46	5,000 00
St. Catharines Custom House do ..		120 00	
Toronto Custom House do ..		429 52	
do Examining Warehouse do ..	376 45		
do Forts do ..		1,197 80	
do Immigrant Shed do ..		264 33	
do Inland Revenue Office do ..		82 35	
do Post Office do ..	20,195 05		
Grosse Isle Quarantine Station, Quebec.....	4,900 00	5,429 97	
Laprairie Barracks do ..		250 00	
Montreal Custom House do ..		2,046 26	
do Examining Warehouse do ..	18,533 75		
do Inland Revenue Office do ..		340 00	
do Post Office do ..	30,166 98		
Quebec Citadel Buildings do ..		1,436 91	
do Custom House do ..		4,906 01	
do Fortifications do ..		21,071 75	
do Gunnery School do ..		577 50	
do Observatory do ..		317 15	
do Post Office do ..		2,927 67	
do Public Buildings do ..		303 48	
St. John's Post Office do ..	1,714 28		
St. Vincent de Paul Penitentiary do ..	7,281 96		
Three Rivers Custom House do ..		476 05	
Chatham Custom House, New Brunswick ..		256 59	
Dorchester Penitentiary, Maritime Provinces ..	64,045 07		
St. John Barracks New Brunswick.....	7,405 99		
do Custom House do ..	18,832 02		
do Penitentiary do ..		62 00	
do Post Office do ..	7,895 45	147 80	
do Quarantine Station do ..		418 95	
do Savings Bank do ..	470 64		
Halifax Dominion Buildings, Nova Scotia.....		2,854 80	
do Drill Shed do ..		93 21	

APPENDIX No. 1.—*Concluded.*

Name of Work.	Construction.	Repairs.	Staff and Maintenance.
	\$ cts.	\$ cts.	\$ cts.
<b>PUBLIC BUILDINGS.—<i>Concluded.</i></b>			
Halifax Penitentiary, Nova Scotia.....		50 97	
do Quarantine Station do .....		114 04	
Pictou Custom House do .....		149 48	
Sydney Marine Hospital do .....		682 70	
Yarmouth do do .....		255 07	
Charlottetown Dominion Building, P. E. Island.....		2,454 80	
do Drill Shed, &c. do .....		406 00	
Manitoba Custom House, &c.....		1,037 81	
do Penitentiary .....		604 80	
Rattleford Buildings, North-West Territories.....	68,093 44		
New Westminster Penitentiary, British Columbia..	23,005 47		
Victoria Public Buildings.....		664 50	
Telegraph Lines, British Columbia.....			37,148 74
<b>RAILWAYS.</b>			
Pacific, Thunder Bay .....	\$12,282 57		
do Fort Frances Lock.....	114,430 27		
do Generally .....	1,778,961 87		
do Surveys.....	322,695 42		
	2,228,373 13		
Intercolonial .....	408,816 74		1,811,273 56
Prince Edward Island.....	6,551 86		221,522 49
Totals.....	7,519,886 45	367,013 42	2,408,893 13
Grand Total.....			10,295,793 00

J. BAINE,  
Accountant.

DEPARTMENT OF PUBLIC WORKS,  
OTTAWA, 30th June, 1878.

## APPENDIX No. 2.

## ST. LAWRENCE NAVIGATION.—TABLE OF DISTANCES.—A.

FROM STRAITS OF BELLE-ILE TO DULUTH, AT HEAD OF LAKE SUPERIOR, BY WATER.

From	To	Sections of Navigation.	Statute Miles.	
			Inter- mediate.	Total to Straits of Belle-Ile.
Straits of Belle-Ile.....	Cape Whittle.....	Gulf of St. Lawrence.....	240	240
Cape Whittle.....	West Light, Anticosti.....	do do .....	201	441
West Light, Anticosti.....	Father Point.....	River St. Lawrence.....	202	643
Father Point.....	Rimouski.....	do .....	6	649
Rimouski.....	Ric.....	do .....	12	661
Ric.....	Isle Verte.....	do .....	39	700
Isle Verte (opp. Saguenay).....	Quebec.....	do .....	126	826
Quebec.....	Three Rivers.....	do to Tidewater.....	74	900
Three Rivers.....	Montreal.....	do .....	86	986
Montreal.....	Lachine.....	Lachine Canal.....	84	994
Lachine.....	Beauharnois.....	Lake St. Louis.....	154	1,009
Beauharnois.....	St. Cécile.....	Beauharnois Canal.....	114	1,021
St. Cécile.....	Cornwall.....	Lake St. Francis.....	324	1,053
Cornwall.....	Dickinson's Landing.....	Cornwall Canal.....	114	1,065
Dickinson's Landing.....	Farran's Point.....	River St. Lawrence.....	6	1,070
Farran's Point.....	Upper end of Croyle's Island.....	Farran's Point Canal.....	4	1,071
Upper end of Croyle's Island.....	Williamsburgh or Morris- burgh.....	River St. Lawrence.....	104	1,081
Williamsburgh.....	Rapid Plat.....	Rapid Plat Canal.....	4	1,085
Rapid Plat.....	Point Iroquois Village.....	River St. Lawrence.....	44	1,090
Point Iroquois Village.....	Upper end Presqu'île.....	Point Iroquois Canal.....	3	1,093
Presqu'île.....	Point Cardinal, Edwards- burgh.....	Junction Canal.....	24	1,095
Point Cardinal.....	Head of Galops Rapids.....	Galops Canal.....	2	1,097
Galops Rapids.....	Prescott.....	River St. Lawrence.....	74	1,105
Prescott.....	Kingston.....	do .....	59	1,164
Kingston.....	Port Dalhousie.....	Lake Ontario.....	170	1,334
Port Dalhousie.....	Port Colborne.....	Welland Canal.....	27	1,361
Port Colborne.....	Amherstburgh.....	Lake Erie.....	232	1,593
Amherstburgh.....	Windsor.....	River Detroit.....	18	1,611
Windsor.....	Foot of St. Mary's Island.....	Lake St. Clair.....	25	1,636
Foot of St. Mary's Island.....	Sarnia.....	River St. Clair.....	33	1,669
Sarnia.....	Foot of St. Joseph's Island.....	Lake Huron.....	270	1,939
Foot of St. Joseph's Island.....	Foot of Sault St. Mary.....	River St. Mary.....	47	1,986
Sault St. Mary.....	Head of Sault St. Mary.....	Sault St. Mary Canal.....	1	1,987
Head of Sault St. Mary.....	Point aux Pins.....	River St. Mary.....	7	1,994
Point aux Pins.....	Duluth.....	Lake Superior.....	390	2,384

Of the 2,384 miles from the Straits of Belle-Ile to the Head of Lake Superior, 714 miles are artificial navigation, and 2,312½ open navigation.

Straits of Belle-Ile to Liverpool, 1,942 geographical, or 2,234 statute miles.

The total fall from Lake Superior to Tide-water is about 600 feet.

APPENDIX No. 2.—*Continued.*

TABLE OF DISTANCES.—B.

FROM PRINCE ARTHUR LANDING (LAKE SUPERIOR), TO FORT GARRY (WINNIPEG), BY THE CANADIAN ROUTE.

	Statute Miles.	
	Inter- mediate.	Total.
Prince Arthur Landing to Lake Shebandowan.....	45	45
Lake Shebandowan to North-West Angle.....	312	357
North-West Angle to Fort Garry (Winnipeg).....	95	453

The Steamboat voyage from Collingwood to Prince Arthur Landing is 532 miles.

### APPENDIX No. 3.

#### LACHINE, BEAUHARNOIS, ST. OURS, CHAMBLY, ST. ANNE, CARILLON, CHUTE A BLONDEAU AND GRENVILLE CANALS.

CANAL OFFICE,  
MONTREAL, 29th October, 1878.

SIR,—I have the honor to transmit herewith my report on the various works under my charge, for the last fiscal year, in accordance with your instructions No. 46,161 of the 27th ultimo.

No serious accidents, nor any detention to navigation, have occurred during the year, except on the Chute à Blondeau Canal where a portion of the lock wall gave way.

With the exception stated, the old works have been maintained in a state of efficiency, notwithstanding the dangerous condition of some of the locks, especially on the Chambly, Carillon and Grenville Canals.

The new works on the Lachine Canal have been carried on successfully and are now far advanced, except at the upper entrance, where much yet remains to be done, notwithstanding the great exertions made by the Contractors during the year.

On the Carillon Canal, the new works are in the same condition as previously reported, nothing having been done since the preceding fiscal year.

On the Grenville Canal, the works under contract, from the combined locks upwards including the upper entrance, have been nearly completed.

Considering the very dilapidated condition of the old works, it is highly desirable, in the public interest, that the new works on the Carillon and Grenville Canals should be completed as soon as possible.

The monthly registers of the highest and lowest water on each canal are appended hereto, together with statements showing the amounts collected for fines, damages, wintering of vessels, basin, firewood and bank dues.

#### LACHINE CANAL.

This Canal was unwatered during the winter, in order to enable the Contractors to proceed with the works of enlargement.

The water was drawn off on the night of the 4th December 1877 and re-admitted during the night of the 6th May 1878, and the canal was fully opened for navigation on the 8th of May.

No interruption to the traffic occurred during the year.

During the period from 1st July 1877 to the close of navigation, general repairs were made to the wharves, flour sheds, roads, bridges, towing path, weirs and off-take drains, &c. The dwelling houses lately acquired by the Government above the St. Gabriel Basin and occupied by 13 men employed on the Canal and entitled to a residence or to an allowance for rent in lieu thereof were also thoroughly repaired. There are nine of these houses, most of which were in very bad order when taken possession of by the Department.

The following repairs were made during the winter and spring months.

#### *Lock No. 1 at lower terminus.*

Two new binders on upper gates and four new valve screws and casings were provided and placed.



---

*Lock No. 2.*

Four new binders, four chains and two sets of valve screws were placed in upper gates. The valves of these gates were removed, repaired and replaced and the lock recesses were cleaned out. Two new valves were provided, but not used and are now available for future use.

*Lock No. 3.*

The upper gates were provided with new binders, and the connecting rods of both pairs of gates were straightened and furnished with new coupling bolts. The lock bottom was cleaned out; the planking between the recesses of the lock chamber was removed and the spaces between the foundation timbers underneath were repuddled; the old planking was afterwards relaid and sheeted over with a new course of two-inch dressed plank.

*Lock No. 4.*

Four binders were renewed and the valve rods were repaired in the upper gates; new connection rods were furnished for both pairs of gates. The lock bottom was cleaned, the planking of the recesses taken up and the puddling between the foundation timbers underneath was renewed; the old three inch planking was afterwards relaid and covered with a course of new two-inch dressed plank. Two of the valve screws in the lower gates, and one in the upper gates, were renewed.

*Lock No. 5 at upper terminus.*

The lower gates were cleared of the staunching material placed there by the Contractor of Section 9, and some of the stones displaced by water from the rock bottom of the lock chamber were removed. Two pairs of valve screws were furnished and the connecting rods were partly repaired and partly renewed in the lower gates.

*Bridge No. 1 across Lock No. 2 at Montreal.*

The masonry under the centre roller, having got into very bad condition, was removed and replaced by timber work of oak formed of old condemned lock gate bars. The segment plates, centre roller and two heel rollers were renewed. Three of the centre stringers, which were split, were repaired, by placing iron plates on their top and bottom sides, secured with screw bolts. The floor of this bridge was renewed.

*Bridge No. 2 or the Wellington Street bridge.*

Connecting the City of Montreal with Point St. Charles, is operated and maintained by the Grand Trunk Railway Company.

*Bridge No. 3 at St. Gabriel Lock.*

The masonry supporting the track on which the heel of this bridge turns, had to be removed to make room for the south wall of the new lock No. 3; after this wall was completed a timber foundation was placed and new segment plates were laid on it for the bridge to turn on. The pivot and socket were taken out, turned, bored and replaced, and a steel disc was placed on top of the pivot. Three new rollers were also placed under the centre of the bridge. The temporary bridge, connected with this swing bridge, had to be removed and to be placed on bents, to allow the new lock masonry to be continued. Both of these bridges were floored with new plank last spring.

*Bridge No. 4 or Brewster's Bridge.*

with the stationary bridges in connection with it, are new bridges which were built in June 1877, and required no repairs beyond the renewal of the flooring.

*Bridge No. 5, at Côte St. Paul*

was replaced by a new one over the enlarged canal.

*Bridge No. 6 at Lachine Guard Lock*

was replanked together with five stationary bridges in its vicinity.

There are five swing bridges and eighteen fixed bridges in connection with them on this canal, which are maintained by Government; the whole of them have to be replanked once a year and many of them, twice, owing to the heavy traffic over them.

*Waste weir at head of Basin No. 2.*

All the planking of the raceway was removed; the floor timbers and mud sills were bedded in puddle, and the flooring was relaid, and covered with an upper course of new two-inch dressed plank. A trench was dug along the upper face of this weir, in which new sheet piling was placed three feet deeper than the old piling, and the trench was filled with concrete and grouted. The rear of the west side wall was stripped and the foundation puddled. Four of the sluice gates were removed and new slides of oak were bolted to the masonry for the gates to work on; two of these gates received new working screws and nuts. Three supporting cribs were built on the floor of the raceway butting against the masonry of the piers; they are each 30 ft. long by 6 ft. wide and 6 ft. high, and are filled with stone; they are intended to support the piers and by their weight to prevent the floor of the raceway from raising. A boom 115 feet long, 6 feet wide at centre and 18 inches wide at the ends, was framed and placed in front of this weir to fend off vessels which might be driven against it by accident since the point of land, which formerly existed in front of it, has been removed for the canal enlargement.

*Weir at Lock No. 3.*

The sheeting of the tail-race, which had been displaced by frost, was relaid, and the wall in front was pointed.

*Weir at Lock 4.*

Four of the swinging sluice gates were taken out; their shafts were straightened and new steel discs were placed on the pivots. The masonry was also pointed.

*Flour Sheds.*

There are seven of these, five of which at basin No. 2 and two at St. Gabriel basins; the latter are nearly new, are not much used, and have required no repairs; those at basin No. 2 are used not only for flour but for coal, salt, iron and general merchandize.

They were thoroughly repaired during the spring: the floors of these sheds have to be renewed or repaired several times each season.

*Wharves.*

Those of basins Nos. 1 and 2 were thoroughly repaired last spring.

### *Banks, Roads, &c.*

The road on the west side of the St. Gabriel basin was macadamized this season with stone delivered last fall for that purpose; it is 800 feet long and 18 feet wide.

A road is now being made on the berm bank on the south-east side of the canal, on section No. 7 at Côte St. Paul; it is formed of quarry refuse blinded with coarse sand taken from section No. 9; it is about one mile in length and the macadam is not less than 11 feet in width; it is intended to continue this macadam upwards on section No. 8 to the point where the road leaves the canal bank.

Three hundred snubbing posts were placed along the banks; nearly 100 of these were transferred from the old to the new banks.

### NEW WORKS OF ENLARGEMENT.

#### SECTION No. 1.

The work on this section consists in the construction of two locks with their entrances, an intervening basin, bridge abutments, waste weir and tail race.

#### *Lock No. 1.*

At the end of the past fiscal year, the timber and concrete foundation had been laid from the upper end to within 17 feet of the lower mitre-sill platform, and the walls were carried up for an average height of 5 feet to within 35 feet of the same point.

During the remainder of the season the foundation was completed and the masonry was built to a height of 29 feet at the upper end and of 25 feet at the lower end. Great difficulty was experienced on account of quicksand in placing the foundation timbers of the new mitre-sill platform at the lower entrance; in order to secure the work, two rows of timber piles were driven, in addition to the ordinary sheet piling, one below the mitre-sill platform, 15 feet long and 10 inches square, and another from 16 to 20 feet in length, at the foot of the lock; concrete from 2 to 2½ feet in depth was placed under the foundation timbers from the mitre-sill platform to the foot of the lock. The laying of masonry was discontinued on the 1st of November and resumed on the 25th of May; the walls are now completed except a short piece of the four upper courses at the lower end.

#### *Basin No. 1.*

The dock wall surrounding this basin is now completed, and the mooring hooks have been placed on them; the wharf on the south side and two ends is almost finished; the roadway outside of the wharf is nearly graded, and the macadam and pitched stone facing of the banks have been begun. About 400 feet in length of the paved water table between the old and new basins have also been laid. The bottom of the basin at its upper end was paved with stone from the lower entrance of lock No. 2 downwards for a distance of about 30 feet and a width of 60 feet, to guard against undermining when the lock is being emptied for the lockage of vessels.

#### *Lock No. 2 &c.*

During the latter part of the season of 1877, the masonry of this lock was completed; the bridge abutments and bridge over the tail race at Mill Street were constructed, and a large portion of the excavation for the upper entrance and raceway was removed; during the winter and spring this excavation was completed.

The foundations for the retaining wall and weir above the lock were commenced on the 4th of April, and previous to the opening of navigation the masonry of the weir and retaining wall was finished; since that time, the timber and plank flooring of the raceway below the weir have been laid and the side walls have been built, except a small portion below the bridge.

The masonry in the bridge abutments above water in canal, as well as that of the centre pier and turn table, at the upper end of the lock, remain to be done.

Before the opening of navigation, a stop-gate was built and placed in the recess prepared for it at the head of the lock; it is constructed of solid oak and pine timber bolted together similarly to a lock gate, and is retained on the upper side by three knuckle jointed bars the lower ends of which are anchored in a bed of timber and concrete at the upper end of the lock recess.

Two temporary gates were built and placed over the sluice ways of the new weir and bolted to the masonry; this was done to exclude the canal water from the tail race and to give the contractor an opportunity of finishing it during the summer.

The stop-gate and temporary gates not being included in the contract were built by days labor, under the supervision of the Canal Superintendent.

### SECTION No. 2.

This section includes the construction of Wellington Basin and the enlargement of basin No. 2.

#### *Wellington Basin.*

The dock walls and the wharves adjacent thereto, which were nearly finished at the date of the last report, were completed during the season. The cast iron mooring heads have been placed on the coping this summer and the grounds outside of the wharves are now being graded. This basin may now be considered finished.

#### *Basin No. 2.*

The dredging in this basin is progressing favorably. The greater part of the material, down to a depth of 13 feet below water surface, has been removed, and about twenty-five per cent. of the work on the 19 feet channel leading through it from the new lock to the Wellington basin is done; as this channel, near the new lock, is close to the old dock wall on the south side, and as the foundation of this wall was only 10 feet below the water surface, it was necessary to excavate beneath it to the depth of the new channel and to build masonry to that depth under the old wall, which was done before the opening of navigation.

### SECTION No. 3.

The excavation of the lock and weir pits was completed during the year; the timber foundation was laid and the masonry of both these structures was begun. The walls of the lock were built up to a height of 16 feet. The south wall of the weir was built as far as the bridge abutment and the north wall was connected with the masonry of the head race leading to the mills below Seigneur street.

During the winter and spring, before the opening of navigation, the pitched stone facing of the bank above the lock, on the south side of the canal was built and the dock wall about 2,500 feet in length below the lock, was carried up to water level. The retaining wall, below the lock, was extended downwards for a distance of 260 feet. The breast wall at the head of the lock and the side walls of the upper recess of the lock were built.

Since the opening of navigation, the lock walls have been completed and retaining walls 100 feet in length have been constructed above the lock and weir.

Some dredging has been done below the lock, and there remains very little to be done to complete the excavation which consists chiefly of levelling in the bottom of the canal and which will be done next winter.

The work on this section is rapidly approaching completion, the masonry of Wellington street bridge being the only considerable piece of work remaining to be done.

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#### SECTION No. 4.

The work at Brewster's bridge was completed last season and stone was delivered and prepared for the Grand Trunk Railway bridge and for the remainder of the side walls. Excavation was made on the island at the lower end of the section and as much side wall was built as could be done while the water was in the canal.

During the winter and spring, the excavation and side walls were finished and the abutments and piers of the Grand Trunk Railway bridge were constructed.

The entire work was completed on the 21st of May, and the final estimate is now being made.

#### SECTION No. 5.

Dredging was continued on this section throughout the summer and autumn of 1877, and the ends of the river St. Pierre culvert and the side walls of the new embankment outside of the old canal were built; the remainder of the side walls was nearly finished during the ensuing winter, and in the spring the arches of the St. Pierre culvert were constructed.

The dredge is still at work and the contractor expects to have the whole completed next spring.

#### SECTION Nos. 6 AND 7.

The foundations of the new lock at Côte St. Paul, including the mitre-sill platforms and mitre-sills, were laid during the summer, and the walls were built to a height of 9 feet. The outer end of the by-wash and both ends of the culvert were also built and a large amount of excavation was done by dredges.

During the winter and spring the excavation was made for the foundations of the piers and abutments of the bridge and for the culvert on section 7, as well as for the slope wall on the north side of both sections.

In the spring, the masonry of Côte St. Paul bridge, and of the by-wash, together with the arch of the culvert, was completed. A large amount of side wall of different kinds was also built.

Since the opening of navigation, the lock walls have been finished, except a few pieces of coping, and the retaining wall at the upper end of the lock is being built.

On the north side of section 7 the bank is formed, and the off-take drain is nearly completed on the south side.

Four dredges are now at work on these sections.

At the Côte St. Paul road, a swing bridge 120 feet long by 12 feet wide, and two fixed bridges each 38 feet in length and 16 feet in width, which had been prepared during winter, were placed in position as soon as the masonry was ready for them. The material of the old bridge, so far as suitable for the purpose, was used in the new work. This swing bridge, which works on a centre pivot and covers two spans each 46 feet in width, can be opened or closed easily by two men in thirty seconds.

A sluice gate with machinery to work it was also prepared and placed in the new by-wash.

The bridges and gate were built by day labor under the directions of the Canal Superintendent.

#### SECTION No. 8.

Excavation by dredging was continued until the close of the season of 1878; at the same time, some culvert masonry for off-take drains was built and the public road on the south side was graded.

As soon as the canal was unwatered, after the close of navigation, a large force was organized and kept steadily at work upon earth and rock excavation and upon masonry of side walls, until the re-opening of navigation. Satisfactory progress was made during that period and there now remains only a small quantity of earth and rock to be removed. The side wall on the north side is finished, whilst on the south side over three fourths of it are built.

Since the opening of navigation the contractors have been engaged in building a puddle wall in the north bank at points where leaks occurred after the removal of the inner slope; they also finished some small culverts for drainage and graded a portion of the berm bank.

#### SECTION No. 9.

Very little work was done on this section by the contractor during the past year. Dams were built, pumps erected and the usual preparations made in autumn, but during the winter, the operations were not carried on with vigour, and on the 16th of March the contractor abandoned the work altogether.

After that date a considerable force was employed by the Department under the immediate supervision of the Canal Superintendent, in order to prepare the section for the opening of navigation; this was effected by removing a large quantity of earth and rock excavation, constructing side walls, removing the temporary dams and all other obstructions.

No portion of this section is yet completed, nothing having been done on it since the beginning of last May.

#### SECTION No. 10.

All the earth excavation has been done, and the rock excavation is nearly completed. That part of the work which comprises the widening and deepening of a portion of the old canal is entirely finished. The side walls of the entire section are nearly completed.

In the lock pit, the timber foundation was commenced, one mitre-sill was framed and the second was being put together. Almost all the stone required for the lock walls was dressed and on the spot together with a large quantity of backing and other materials. Derricks were afterwards erected and every preparation was made for commencing the masonry without delay.

The lock masonry is now so far advanced that little remains to be done for its completion, together with that of the remainder of the work connected with the lock.

The excavation from this section having been deposited in the river on section 11, now forms an embankment which extends to a distance of 3,500 feet above the lock.

#### SECTION No. 11.

During the summer of 1877 everything progressed favorably. The embankment made from the surplus excavation from section 10 formed slack water in which the cribs were easily and accurately placed in position.

All the crib-work in the side dam adjoining the old pier on the south side of the upper entrance of the old canal was completed and ready for the sheet piling. The double crib-work in the outside line for the dam on the south side of the new entrance of the enlarged canal was extended to within 200 feet of the point where it is to terminate at the junction with the transverse dam. About 1200 feet of the chamber between the double line of crib-work were sheet piled and ready to be filled with puddle.

The first crib of the 30 feet pier in continuation of the double crib-work was placed, and several guide-piers were built on the north side of the channel.

The whole number of cribs sunk during the year is 244, representing 5,128 lineal feet of continuous crib-work.

The deepening of the upper portion of the channel by sub-marine blasting was carried on when practicable, and about 4,000 cubic yards were removed during the year.

Since the beginning of the present fiscal year, the works on this section have been considerably advanced, and the contractors have made all exertions to push them forward as speedily as possible.

## BEAUHARNOIS CANAL.

This canal was closed on the 6th of December, 1877, and re-opened on the 24th of April 1878; during this open period of 226 days, no interruption to the trade occurred.

During the first six months of the fiscal year from 1st of July to 31st of December 1877, the principal work done was the building of a large frame house 66 x 24 feet on the south side of the canal, above lock No. 7, comprising three dwellings one of which for each of the lock-laborers and for the bridge tender. The houses of the lockmasters at this lock and at lock No. 6 at the lower entrance of the canal, were partially rebuilt and enlarged. Considerable repairs were made to the houses of the lockmasters at locks Nos. 8 and 13, and to the buildings occupied by the Superintendent and Collector.

Last winter, timber for a swing bridge, double windows and porches for the houses of the lockmasters and lock laborers, were prepared.

A new pair of lower gates for lock No. 11 and a pair of upper gates for lock No. 13 were built and hung in these locks. New hooks were placed on the upper gates of locks Nos. 6, 7 and 9, and on one of the lower gates of lock No. 9. One knee and the top pine bar of one of the gates of lock No. 8 were renewed, and two lifting-rod boxes or casings for working the valves were placed on the gates of locks Nos. 8, 10 and 13, and another at lock No. 14.

During the year 9 pairs of gates were hauled out of the canal and taken to pieces, and four pairs were rebuilt. Two pairs are now on hand, one of which being lower gates to be used immediately at the guard lock No. 14, and the other being intended to replace the lower gates of lock No. 11, when required.

The swing bridge at lock No. 14 was partially rebuilt, its cap pieces, posts, pivot beam, cross-beams, floor and main posts having been renewed; it received two coats of paint and was provided with a lamp. The bridges, at locks Nos. 8, 10, 11 and 12 and at St. Timothy, were painted, and most of them were replanked. A new bridge 30 x 24 feet was built at Valleyfield. Seven farm bridges were rebuilt and all the others were repaired.

The houses of the lockmasters at locks Nos. 10, 11, 12 and 13, those of the laborers at locks Nos. 11 and 12, with seven of the watch-houses, received an external coat of paint, including the roofs. The bridge-keeper's house at St. Timothy was painted inside and outside, and the iron-work of the gates at locks Nos. 6, 7, 8, 9, 10, 11 and 12 was also painted.

The banks, towing paths, slope walls, wharves and fences were thoroughly repaired, and the side ditches, off-take drains and culverts properly cleaned.

Two leaks were staunched, one on the south side of the culvert above St. Timothy bridge and another in the St. Timothy weir.

Two bumping posts were renewed and three repaired at locks Nos. 6 and 8. A large number of the snubbing posts on the canal banks were renewed.

The dam at "Ile aux Chats" and the dyke at Hungry Bay were maintained in good order, but will soon require to be raised.

## CHAMBLY CANAL.

This canal was closed by ice on the 2nd of December 1877, and re-opened on the 1st of May 1878, during which period of 214 days, no interruption to the traffic occurred.

Lock No. 1 was provided with one new balance beam. One of the balance beams and two of the posts at Lock No. 2 were renewed. Lock No. 3 was furnished with a pair of new gates, new foot bridges and a new balance beam on the lower gates; its mitre-sills were repaired and some of the projecting stones inside of the lock chamber were dressed down at Lock No. 4, two new balance beams and new foot bridges were placed on the lower gates; the mitre-sill was also repaired and a snubbing post was put in the towing path above the lock.

At lock No. 5, one new balance beam and a new foot bridge were placed on the lower gates; new fenders were also supplied for protecting the upper end of the lock masonry on the tow path side. One of the balance beams of lock No. 6 was renewed, the upper gates of lock No. 7 and the mitre-sill of lock No. 8 were repaired. At lock No. 9, the masonry of the south wall was repaired with stone, and that of the north wall with timber.

Bridge No. 1. The wing wall on the north side was repaired; that on the south side was rebuilt with timber; the superstructure was also repaired.

Bridges Nos. 2, 3, 4, 5 and 6 were also repaired.

Bridge No. 7 leading to the railway station was renewed; the crossing over the side ditch opposite the south end of this swing bridge was renewed with stone side walls, and a wooden platform thereon, upon the berm side of the canal, where the roadway was afterwards widened.

Bridge No. 8 was replanked, and 7 small road bridges on "Ste. Thérèse" Island were repaired.

The by-wash at Wood's Creek, and that below lock No. 6 were rebuilt; the by-washes at Lapalme's and Fryers were replanked and repaired.

The banks, towing-paths, roadways, slope walls, and fences were repaired throughout, and the culverts and ditches were cleaned, where most required.

The canal was deepened and widened at the narrowest and shallowest places, by dredging during the month of May and the first week of June, for a total distance of about 3,000 feet; the material from the excavation was used to widen the narrowest portion of the towing path.

A watch-house was built at lock No. 1 and a store-house was erected at Chambly. The lockmasters' and bridge-keepers' dwellings, together with the canal office were repaired and kept in good order. New fences were built around the Canal office and on the line between the canal property and the land occupied by Mr. Maurice.

The masonry of some of the locks and bridge abutments on this canal is in a dilapidated condition, and should be renewed.

A portion of the landing pier at the lower entrance of this canal from the lock downwards for a distance of about 300 feet is generally covered with from 1 to 2 feet or more of water during high water, the remainder of the pier outward being above high water level; this is a cause of much inconvenience to vessels landing at the pier, especially when freight has to be delivered; it is therefore desirable that the entire pier should be raised to the same level so soon as funds can be granted for the purpose.

#### RIVER RICHELIEU IMPROVEMENT.

At the close of the last fiscal year, the steam dredge No. 1, was working on the shoal opposite St. Antoine Village some 20 miles below Chambly; it continued to work there and between that place and St. Ours lock about 12 miles further down, until a channel not less than 100 feet in width, and 7 feet in depth at low water, was formed through all the intervening shoals.

On some of the shoals it was only necessary to remove boulders with a stone lifter to obtain the depth of 7 feet; one of those in the channel, about 2 miles below St. Antoine Church, had only  $5\frac{1}{2}$  feet of water over it at low water; it measured  $11 \times 10 \times 8$  feet and was disposed of by digging a hole alongside of it with the dredge, and by canting it afterwards into the hole, where it now remains imbedded at a depth of 9 feet below low water surface instead of  $5\frac{1}{2}$  feet.

After clearing out the approaches to the lock at St. Ours the dredge was removed to Chambly Basin where 4 small shoals in the channel were excavated to a width of 100 feet and a depth of 7 feet, at low water; the lower entrance of the Chambly canal was then dredged to the same width and depth; this work was completed on the 15th of November when the dredge entered the canal and was laid up for the winter.

Immediately after the opening of navigation, the dredge worked in the canal, for about a month, during which time the channel was widened and deepened at several

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places for a total length of 3,000 feet ; towards the second week of June she was towed down to the Village of St. Denis which is situated on the eastern shore of the Richelieu, a short distance below St. Antoine which is on the opposite shore ; she then commenced to excavate the approaches applied for, from the deep water channel to the wharves along the front of the village, so that vessels navigating the main channel can reach them with the same draft of water as through the St. Ours lock ; these approaches, one of which leads to the centre and the other to the lower end of the village, were intended to be 75 feet in width and to be connected by a channel of from 50 to 75 feet in width along the front of the wharves ; this work is now completed and the dredge is at present working at the approaches from the main channel to the wharves at St. Antoine, where the dredging is expected to be finished in the course of November this year. According to the plan and estimate already furnished with a previous report on the 17th of last September, the total quantity of dredging required to be done at St. Denis and St. Antoine is 20,500 cubic yards for a depth of  $7\frac{1}{2}$  feet during low water.

When the work now in progress is completed, the dredge will be sent to winter in the Chambly canal, where it can again be used to great advantage, unless required elsewhere next summer.

#### ST. OURS LOCK AND DAM.

This lock was closed on 5th of December, 1877 and re-opened on 1st April, 1878. Navigation was not interrupted during the year.

The lock gates with their crabs, chains, &c., were repaired. The lower gates were raised, adjusted and furnished with four new chain rollers and frames.

Some of the mooring posts were renewed and four others were placed on the island above the lock. The guide piers above, and the mooring pier below the lock were kept in good repair. The landing stages were removed in November and replaced in June.

On both sides of the lock, the water tables were paved with brick.

Before the water rose in the spring the ice was cut away from the gates and pier at the lower end of the lock.

The superintendent's house and outbuildings, together with the fences were repaired and kept in good order.

Preparations have been made to repair the top sheeting of the dam as soon as the water is sufficiently low.

#### ST. ANNE'S LOCK AND DAM.

Navigation through this lock was closed by ice on the 4th of December 1877, and opened again on the 15th of April 1878 ; no interruption to it occurred through out this period.

The works were maintained in good order with very light repairs and renewals. New working chains were supplied to the lock gates, and some defective mooring posts were replaced by new ones.

#### NEW WORKS.

The works connected with the new channel through the shoals below the lock, are now nearly completed and have been in use since last autumn.

At the close of the last fiscal year, the small quantity of work remaining to be done under Mr. Becker's contract consisted chiefly of excavation in that part of the channel which is protected on either side by cribwork and embankments ; this was finished by the 27th of August 1877 on which day the pumps were stopped and the removal of the coffer dams at either end of the cut was begun ; this portion of the channel is 1200 feet in length, 120 feet in width and  $10\frac{1}{2}$  feet in depth at low water.

The Government steam dredge "Queen of Canada" which had been laid up in the Lachine Canal for some time, was fitted out and sent up in September following, with a stone lifting scow, to deepen the remainder of the channel as far as the deep water channel downwards, along the north shore of Isle Perrot.

This dredge worked here until the middle of November when she met with a serious break in her machinery; she was then withdrawn to Lachine to winter there; she was repaired last spring, and on the 19th of May, she returned to St. Anne's where she has been working since on the lower approach, until such time as it was found necessary to get a more powerful dredge, the material to be removed being of a very hard nature and consisting of a compact bed of cemented stone and gravel; the dredging is now being done by Messrs. Hickler and Co., contractors and will shortly be completed.

Tenders for the construction of the new lock have lately been called for

#### CARILLON CANAL.

This canal was closed on the 5th of December, 1877, and re-opened on the 19th of April, 1878.

Owing to the lowness of the water in the Ottawa River, the approaches to locks Nos. 1 and 3 had to be cleared out during the autumn.

Ordinary general repairs were done as usual. The walls of locks Nos. 1, 2 and 3 were pointed. At lock No. 2, the manhole on the south side was taken down and rebuilt together with the hollow quoin, and a new quoin coping was furnished. At lock No. 1, new sluice gates were put in, the heel post, sluice castings, crabs, chains, &c., were repaired or renewed, blocks were made and the swing beams were painted. The lower gates at lock No. 3 were strengthened by an iron girder.

The lock houses, fences, canal banks, towing-path and public road were repaired; the crib-work above lock No. 2 was renewed, and the canal prism was cleaned before opening of the navigation.

There are no spare gates available in case of accident, for the locks of this canal.

A large portion of the dam on the south side of the island in the North River, which was destroyed by freshets last autumn, was rebuilt in the month of May.

#### CHUTE A BLONDEAU.

Two detentions to navigation occurred during the first half of the fiscal year. On the first of August, the recess wall on the south side of lock No. 4 fell down, thereby interrupting the traffic for 36 hours, and on the 17th of the same month an interruption of 10 hours was caused by the lowness of the water.

The lock and its approaches were thoroughly cleaned, and the lock walls, gates, sluices, watch-house, and lockmaster's dwelling were all repaired.

The state of this lock is such that it cannot be used much longer without being partly rebuilt; this, however, may be avoided if the new canal at Carillon is completed without much further delay.

#### NEW WORKS.

These include a flat dam of about 1800 feet in length across the rapids of the Ottawa River, a short distance above the Village of Carillon, a timber slide 600 feet in length and 120 feet in width, on the south side of the river, and a canal three quarters of a mile in length, with two locks along the north side of the river.

The contractors suspended all operations in May, 1877, and have not resumed them since.

The year was unusually favorable for the prosecution of such an undertaking, the water in the river being low during the summer and autumn of 1877, the warm weather having continued towards the latter end of autumn, besides which the winter was mild and the spring early.

The works previously constructed in the river have sustained a little damage, but not more than was to be expected from their exposed and unfinished condition. Some parts of the temporary cribwork built to support the skeleton bulkhead, were carried away, and the foundation sills of the dam and bulkhead were more or less abraded by passing ice and timber. The permanent structures have not suffered to any appreciable extent.

Unless the works of the new canal and those connected with it, are speedily completed, it may become necessary to reconstruct the locks of the old canal, which are in such a failing condition that they cannot be maintained much longer.

#### GRENVILLE CANAL.

This canal was closed on the 5th of December, 1877, and was re-opened on the 3rd of May, 1878.

Ordinary repairs have been made to the combined locks Nos. 5 and 6, 7 and 8, at the lower entrance of this canal during the latter part of the fiscal year, and before the opening of navigation in the spring, the walls were pointed, the sills were grouted and the stone paving of lock No. 8 was removed and replaced by concrete; a portion of the south wall of the same lock was rebuilt and an extra sluice was made in the side wall. Two pairs of lock gates were repaired and two new sluice gates and frames were made and placed.

These locks are now and have been for some years in a very dangerous state, involving heavy and expensive repairs several times each season.

Locks Nos. 9, 10 and 11 being the new enlarged locks, have required very little repairs since they were built. In the spring, the walls were pointed, two new valves were inserted in the sluices of the gates of locks Nos. 10 and 11; four valves were repaired in the former and 5 in the latter, which was furnished with two new chain rollers. The foot bridges on all these lock gates, and the swing bridge at the guard lock No. 11 were painted.

The canal banks, towing-path, road, fences, building, &c., were repaired and kept in good order.

As there are no spare gates for any of the locks on this canal, timber is now being dressed for one pair suitable to the guard lock.

#### NEW WORKS OF ENLARGEMENT.

The work remaining to be done on sections 1, 2 and 3 of this enlargement or from lock No. 8 to the upper entrance of the canal at Grenville, under Mr. Goodwin's contract, being principally in the prism under water, operations are suspended usually in the summer season and resumed when the canal is emptied after the close of navigation.

In the early part of January a coffer dam was built at the upper entrance 1,200 feet above the guard lock, the canal was unwatered, and the work of excavation was commenced on the 17th of January. During the remainder of the winter the force employed averaged about 3,000 men, with two steam pumps, two steam drills and three steam engines.

Section No. 1,  $1\frac{20}{100}$  miles long, from entrance of canal at Grenville down to lock No. 10.

The entrance above the guard lock has been completed to a width of 50 feet at bottom, with a draught of 10 feet at low water, up to the site of the dam. Above this point the enlargement will be done by dredging.

For a distance of 300 feet below the dam, on each side, a retaining wall of dry stone 5 feet in height, was built along the foot of the slope.

The excavation was also completed to a point one quarter of a mile below the guard lock; there still remains on this section another stretch of about  $\frac{1}{4}$  of a mile which is only partially excavated.

Below each of the mitre sills of the guard lock a hole had been formed in the rock bottom by the rush of water through the sluices; these holes were filled with

concrete and planked over. It was also found necessary to cover the face of the rock foundation under the north bridge abutment with a sheeting of plank to protect it from the action of the water.

Section No. 2,  $2\frac{22}{100}$  miles long, from lock No. 10 down to lock No. 9 at Stonefield.

On this section, a length of 360 feet below the lower approach to lock No. 10, was widened to 40 feet and deepened to 6 feet, and a point of projecting rock, dangerous to navigation, was removed.

The excavation in the canal prism on this section may be considered completed to the full depth of 10 feet, except between lock No. 10 and Dewar's mill, a distance of about 6,200 feet.

Section No. 3,  $0\frac{22}{100}$  miles long, from lock No. 9 down to lock No. 8.

No work was done on this section during the past year; some 1,500 cubic yards of earth and 2,500 cubic yards of rock excavation require to be removed to complete it.

It is important that the remainder of the new works of enlargement, from the upper end of the combined locks No. 7 and 8 down to the lower entrance, should be placed under contract, in order to avoid the reconstruction of the old combined locks if the latter, as is quite possible, should fail, the navigation over this route will necessarily have to be suspended until they are restored or until the new works can be built, as already stated in the report for the last fiscal year. The length of canal remaining to be enlarged, from lock No. 8 downwards, is about  $\frac{1}{2}$  a mile.

#### CULBUTE CANAL.

The locks, dams and mooring piers with their machinery, are in good condition and have required no repairs during the year except a small quantity of pitched stone on the face of the embankment on the upper side of the pier dam on L'Islet to prevent any damage being done by high water.

This work was completed on the 11th of November 1876, but cannot be serviceable to navigation before the projected improvements of the channel between Bryson and the locks are effected, the depth of water on the shoals being only three feet during low water or only one half of the depth then available on the mitre-sills of the locks. Another impediment is the bridge at Chapeau, about 5 miles below Culbute, part of which it is proposed to remove and convert into a swing bridge.

#### CHANNEL BETWEEN BRYSON AND THE LOWER ENTRANCE OF THE CULBUTE CANAL.

*Distance about  $42\frac{1}{2}$  miles.*

Plans for the improvement of the channel from Bryson up to the Culbute Canal were forwarded to the Department before the last annual report was furnished.

During last autumn a survey was made to ascertain the extent of land likely to be damaged by the projected dams at the head of the Calumet and Flat Rapids, and a plan showing all such lands has been prepared and transmitted to the Department.

An examination of the river between Bryson and Culbute, was made last May when it had attained the height of *proposed raised low water*, or the level to which it is proposed to elevate the low water line; the result of this examination has verified the conclusions arrived at by the survey.

Tenders for the execution of the various works required, excepting the proposed swing bridge at Chapeau, have since been called for and the contract has been awarded to John Harvey on the 25th of last July; he commenced work last September.

#### SLIDES AND BOOMS.

##### ST. MAURICE DISTRICT.

My annual report on these works for the fiscal year ended 30th of June, 1878, was furnished on the 1st instant.

I have the honor to be, Sir,

Your very obedient servant,

G. F. BAILLAIRGÉ,

*Assist. Chf. Eng., P. W.*

## LACHINE CANAL.

STATEMENT showing the depth of river water on the mitre sills of Lock No. 1, at lower entrance, and Lock No. 5, at upper entrance, during the Fiscal Year ended 30th June, 1878. (From Lockmasters' Returns.)

Months.	Lock No. 1—Lower Sill.		Lock No. 5—Upper Sill.	
	Highest.	Lowest.	Highest.	Lowest.
1877.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
July .....	18 4	17 11	11 3	10 8
August .....	17 11	17 2	10 8	10 4
September .....	17 3	16 5	11 3	9 10
October .....	16 11	16 2	9 9	9 5
November .....	17 10	16 5	10 7	9 6
December .....	17 11	17 1	11 0	10 0
1878.				
January .....	34 3	17 1	12 1	9 10
February .....	33 6	29 3	10 10	9 11
March .....	29 8	20 4	11 4	10 3
April .....	20 5	18 10	12 4	11 1
May .....	21 3	19 10	13 0	12 3
June .....	19 9	18 6	12 4	11 5

## BEAUHARNOIS CANAL.

STATEMENT showing the depth of river water on the mitre sills of Lock No. 6, at lower entrance, and Lock No. 14, at upper entrance, during the Fiscal Year ended 30th June, 1878. (From Lockmasters' Returns.)

Months.	Lock No. 6—Lower Sill.		Lock No. 14—Upper Sill.	
	Highest.	Lowest.	Highest.	Lowest.
1877.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
July .....	10 9	10 0	12 2	11 1
August .....	10 5	10 0	12 0	11 9
September .....	10 2	9 8	11 10	11 3
October .....	9 5	9 4	11 6	10 11
November .....	10 5	9 4	11 8	11 2
December .....	10 6	10 3	11 6	11 2
1878.				
January .....	13 8	10 6	12 9	11 2
February .....	13 8	12 2	12 0	11 2
March .....	12 2	11 1	12 5	11 10
April .....	12 2	11 1	12 7	12 1
May .....	12 2	11 9	12 9	12 2
June .....	11 9	11 1	12 5	11 11

## CHAMBLY CANAL.

STATEMENT showing the depth of river water on the mitre sills of Lock No. 9, at lower entrance, and Lock No. 1, at upper entrance, during the Fiscal Year ended 30th June, 1878. (From Lockmaster's Returns.)

Months.	Lower Sill.		Upper Sill.	
	Highest.	Lowest.	Highest.	Lowest.
1877.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
July.....	9 10	9 4	8 7	8 1
August.....	9 9	9 3	8 5	8 1
September.....	9 4	8 0	8 4	7 8
October.....	9 0	8 3	9 0	7 6
November.....	10 10	9 0	9 8	8 2
December.....	11 6	10 2	9 6	8 7
1878.				
January.....	13 6	9 4	8 9	8 3
February.....	14 5	13 2	8 6	8 0
March.....	13 4	10 11	9 6	8 0
April.....	15 0	12 1	11 5	9 4
May.....	16 7	12 9	11 3	10 1
June.....	12 9	10 0	10 4	8 10

## St. OURS LOCK AND DAM.

STATEMENT showing the depth of river water on the mitre sills of the St. Ours Lock, during the Fiscal Year ended 30th June, 1878. (From Superintendent's Returns.)

Months.	Lower Sill.		Upper Sill.	
	Highest.	Lowest.	Highest.	Lowest.
1877.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
July.....	9 3	8 9	8 9	8 6
August.....	9 3	8 3	8 9	8 3
September.....	8 5	7 3	8 4	7 11
October.....	8 7	7 4	8 6	7 10
November.....	9 7	7 5	9 8	8 4
December.....	10 3	8 9	9 10	8 9
1878.				
January.....	11 10	8 7	8 9	8 1
February.....	11 7	9 8	8 7	7 10
March.....	14 7	10 11	10 8	8 0
April.....	14 4	11 9	12 3	10 1
May.....	14 9	12 0	12 4	10 5
June.....	11 9	9 7	10 5	8 11

### STE. ANNE'S LOCK AND DAM.

STATEMENT showing the depth of river water on the mitre sills of the Ste. Anne's Lock during the Fiscal Year ended 30th June, 1878. (From Superintendent's Returns.)

Months.	Lower Sill.		Upper Sill.	
	Highest.	Lowest.	Highest.	Lowest.
1877.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
July .....	8 5	8 0	8 8	8 1
August .....	7 11	7 6	8 0	7 5
September .....	7 6	6 11	7 5	6 6
October .....	7 1	6 9	7 9	6 7
November .....	8 0	6 11	9 1	7 3
December .....	8 4	7 6	9 5	8 4
1878.				
January .....	9 11	7 4	8 8	7 8
February .....	8 6	7 4	7 8	7 0
March .....	8 7	7 8	8 4	7 0
April .....	9 9	8 5	10 2	8 1
May .....	11 0	9 7	11 2	10 3
June .....	9 7	8 8	10 3	9 0

### CARILLON CANAL.

STATEMENT showing the depth of river water on the mitre sills of Lock No. 1, at lower entrance, and Lock No. 3, at upper entrance, during the Fiscal Year ended 30th June, 1878. (From Lockmasters' Returns.)

Months.	Lock No. 1—Lower Sill.		Lock No. 3—Upper Sill.	
	Highest.	Lowest.	Highest.	Lowest.
1877.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
July .....	8 4	7 5	8 0	6 8
August .....	7 8	6 9	6 8	5 7
September .....	6 9	5 11	5 7	4 10
October .....	7 0	5 11	6 3	4 10
November .....	8 7	6 10	8 7	6 1
December .....	8 11	8 0	10 5	8 3
1878.				
January .....	8 0	7 9	8 9	7 3
February .....	8 9	6 0	8 0	6 10
March .....	7 11	6 9	7 6	5 10
April .....	9 11	7 6	10 0	6 9
May .....	10 11	10 0	12 2	10 3
June .....	10 5	8 3	10 0	8 5

## CHUTE À BLONDEAU CANAL.

STATEMENT showing the depth of river water on the lower and upper mitre sills of Lock No. 4, at Chûte à Blondeau, during the Fiscal Year ended 30th June, 1878. (From Lockmasters' Returns.)

Months.	Lower Sill.		Upper Sill.	
	Highest.	Lowest.	Highest.	Lowest.
1877.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
July.....	8 8	7 5	8 7	7 3
August.....	7 6	6 5	7 5	6 4
September.....	6 5	5 5	6 6	5 7
October.....	7 0	5 6	7 1	5 7
November.....	9 0	6 5	8 11	6 6
December.....	9 7	8 1	9 5	7 11
1878.				
January.....	9 6	8 0	9 4	7 10
February.....	11 3	7 0	10 6	6 10
March.....	9 0	6 10	9 2	7 0
April.....	10 9	7 2	10 6	7 0
May.....	12 5	10 9	12 2	10 7
June.....	11 1	8 9	10 11	8 8

## GRENVILLE CANAL.

STATEMENT showing the depth of river water on the mitre sills of Lock No. 5, at lower entrance, and Lock No. 11, at upper entrance, during the Fiscal Year ended 30th June, 1878. (From Lockmasters' Returns.)

Months.	Lock No. 5—Lower Sill.		Lock No. 11—Upper Sill.	
	Highest.	Lowest.	Highest.	Lowest.
1877.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
July.....	9 0	7 10	14 0	12 9
August.....	7 10	6 10	12 9	11 4
September.....	6 10	6 1	11 5	9 11
October.....	7 5	6 2	11 10	10 0
November.....	9 6	7 3	14 3	11 7
December.....	9 8	8 9	14 10	13 0
1878.				
January.....	12 0	8 6	12 11	11 5
February.....	13 6	9 0	11 5	10 3
March.....	10 0	8 0	12 2	10 4
April.....	11 0	7 9	16 0	11 9
May.....	12 8	11 2	17 6	16 0
June.....	11 4	9 4	16 3	13 7



## LACHINE CANAL.

## STATEMENT of Fines and Damages collected during the Fiscal Year ended 30th June, 1878.

Date.	Name of Vessel.	Name of Owner.	Fines.	Damages.	Totals.
1877.			\$ cts.	\$ cts.	\$ cts.
July 12	Barge Col. Heg.....	Buckley.....		11 00	
Aug. 16	Barge Broughton.....	Durkee.....	4 00		
" 25	Barge Stephen.....	St. Denis.....	4 00		
Sept. 6	Steamer Cuba.....	Grangle & Geddes.....	4 00		
Oct. 3	Steam Barge Adventure.....	J. Devany.....		100 00	
" 12	Barge Sophie.....	Cinq-Mars.....	4 00		
" 16	Steam Barge Adventure.....	J. Devany.....		100 00	
Nov. 7	Steamer Dagmar.....	Montreal & Ottawa Forwarding Company.....	4 00		
" 16	Barge St. Joseph.....	Page.....	4 00		
1878.					
June 10	Tug William.....	Tate & Co.....		37 15	
			\$24 00	\$248 15	\$272 15

M. CONWAY,  
Superintendent.

LACHINE CANAL OFFICE,  
MONTREAL, July, 1878.

## LACHINE CANAL.

## STATEMENT of amounts collected for Wood Rent and Wintering Vessels during the Fiscal Year ended 30th June, 1878.

Items.	Number.	Rates.	Amounts.
	Cords.	\$ cts.	\$ cts.
Firewood.....	16,594	00 04	663 16
Wintering Vessels.....			493 25
Total.....			1,157 01

JOHN O'NEIL,  
Collector Canal Tolls.

COLLECTOR'S OFFICE,  
MONTREAL, July, 1878.

## LACHINE CANAL.

STATEMENT of Basin, Firewood, Fines and Bank Dues, collected at Lachine,  
for the Fiscal Year ended 30th June, 1878.

Date.	Items.	Amounts.	Remarks.
1877-78.		\$ cts.	
	Basin dues .....	299 37	
	Firewood dues .....	63 79	
	Bank " .....	50 00	
	Fine " .....	6 00	
		418 16	

JOHN DYDE,  
*Collector.*

COLLECTOR'S OFFICE,  
LACHINE, July, 1878.

## BEAUHARNOIS CANAL.

STATEMENT of Fines and Damages, collected during the Fiscal Year ended  
30th June, 1878.

Date.	Names of Vessels.	Master or Owner.	Damages.	Fines.	Totals.
1877.			\$ cts.	\$ cts.	\$ cts.
Oct. 11	Barge St. Marie .....	Captain Jasmin.....	10 00	10 00	
" 12	Steamer Algerian .....	R. & Ont. Navigation Co...	10 00	10 00	
" 22	Propeller Zealand.....	Captain Zeland .....	10 00	20 00	30 00

J. F. BÉIQUE  
*Superintendent.*

CANAL OFFICE,  
MELOCHEVILLE, July, 1878.

## BEAUHARNOIS CANAL.

STATEMENT of amounts collected for Wood Rent and Wintering Vessels during the Fiscal Year ended 30th June, 1878.

Items.	Number.	Rate.	Amount.
Wood Rent..... Cords.	180½	\$0 05	\$9 02
Wintering Vessels.....	None.		

THOS. BROSSOIT,  
*Collector.*

COLLECTOR'S OFFICE,  
MELOCHEVILLE, July, 1878.

## CHAMBLY CANAL.

STATEMENT of amounts collected for Fines and Damages, for the Fiscal Year ended 30th June, 1878.

Date.	Name of Vessel.	Name of Owner.	Fines.	Damages.	Total.
1877.				\$ cts.	\$ cts.
Nov. 24	Jos. Dufresne.....	Jos. Dufresne.....		3 00	
" 26	Str. McMahon.....	Séguin .....		3 00	
" 28	" Milford .....	L. O. Couvrette.....		3 00	
" 30	" Taylor.....	S. Williams. ....		1 00	
				\$10 00	\$10 00

LOUIS OUMET,  
*Superintendent.*

CANAL OFFICE,  
CHAMBLY, July, 1878.

## CARILLON AND GRENVILLE CANALS.

STATEMENT of amounts collected for Wood Rent and Wintering Vessels,  
during the Fiscal Year ended 30th June, 1878.

Items.	Number.	Rate.	Amount.
	Cords.	\$ cts.	\$ cts.
Wood Rent.....	1,050	0 02	21 00
Total.....			21 00

GEORGE SCHNEIDER,  
*Collector.*

COLLECTOR'S OFFICE,  
CARILLON AND GRENVILLE CANALS.  
GRENVILLE, July, 1878.

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## APPENDIX No. 4.

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### CORNWALL CANAL.

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CORNWALL, 3rd July, 1878.

SIR,—I have the honor to submit my Report for the fiscal year ended 30th June, 1878.

The canal was kept in good working order from the 1st July, 1877, to the 8th December following, when it was closed for the winter months. It was opened again on the 22nd April, 1878, and has continued in good working order to the 30th of June.

The repairs have been chiefly confined to the lock gates, supply weirs, rebuilding upper gates of Lock No. 15, making three new lock gate knees, two new lock gate foot bridges, ten new sheaves, raising embankment and slope walls, cleaning drains leading through culverts and side ditches along the canal.

Canal closed on the 8th of December, 1877. Opened for navigation on the 22nd April, 1878.

I have the honor to be, Sir,

Your obedient servant,

D. A. McDONELL,

*Superintendent*

F. BRAUN, Esq., Secretary,  
Public Works Department,  
Ottawa.

## APPENDIX No. 5.

### WILLIAMSBURGH CANALS.

MORRISBURGH, 7th August, 1878.

SIR,—I have the honor to report on the Williamsburgh Canals, for the fiscal year ending the 30th June, 1878.

These canals were opened on the 1st May, 1877, and continued open without any interruption until the 5th December, when they were closed for the winter months. They were re-opened on the 29th April, 1878, since which, there has been an increase in the traffic and number of lockages over the corresponding period of the year 1877.

#### *Farran's Point Canal.*

The upper gates at Lock No. 22 were repaired previous to the opening of the canal this spring. The pier at the entrance of the canal requires to be partially rebuilt and fully repaired; with some stoning for the protection of the banks this canal can be kept in good order.

#### *Rapid Plat Canal.*

The upper gates at Lock No. 23 were taken out and repaired during the past winter; the gates at Lock No. 24 should be taken out and repaired. This, with some further protection and repairs to the banks, would place this canal in the best of order.

The repair of the dock of the slip on the inside of the wharf at the entrance of this canal, and some dredging so that boats could load and unload in the slip, would be of much convenience both to the shippers and parties in charge of vessels.

#### *Iroquois Junction and Galops Canal.*

The lower gates at Lock No. 25 being much out of repair, were taken out and rebuilt during the past winter, and are now in fine working order. The gates at Lock No. 27 should be repaired during the ensuing winter.

The pier at the head of the canal at the Galops Rapids was rebuilt with ice breaker during last fall; the swing bridge over Lock No. 25 requires to be planked over.

The booms and banks have been kept in good repair.

The repairs to these canals have only extended to works urgently needed.

The buoys have been also kept properly placed.

By directions of the Department of Marine and Fisheries, three additional buoys were placed in the Galops Rapids, which are found to be of much advantage to boats descending with vessels in tow.

I have the honor to be, Sir,  
Your most obedient servant,

A. G. MACDONELL,  
*Superintendent Williamsburgh Canals.*

F. BRAUN, Esq., Secretary,  
Public Works Department,  
Ottawa.

## APPENDIX No. 6.

## WELLAND CANAL.

SUPERINTENDENT'S OFFICE,  
ST. CATHARINES, 1st July, 1878.

SIR,—I have the honor herewith to submit my Report of the working and condition of the Welland Canal for the year ended the 30th day of June, 1878.

The canal was closed on the 5th day of December, 1877, and fully opened for traffic on the 9th day of May, 1878.

In the beginning of the winter of 1877-'78, it was found necessary to unwater the canal between Port Robinson and Port Colborne, to enable contractors for the enlargement to proceed with rock excavation and the masonry for bridges on the summit level. In doing this it was essential to retain the water in the deep cut to avoid the sliding of the banks. For this purpose dams were built at Port Colborne, Port Robinson and Allanburg, across the main canal and at the junction across the feeder. The work of enlargement was not in such a state of progress as to admit of the removal of these dams until after the 1st of May, hence the delay to so late a date of the opening of navigation.

The water in the feeder was kept during the winter by order of the Chief Engineer of Public Works, Mr. Pago, at uniform level of three feet above the level of Lake Erie.

Although the canal was unwatered, with the exception of the deep cut, which was kept nearly at lake level, but trifling damage was done to the banks, some small slides in the banks occurring in two or three places, which have been repaired.

One serious break occurred since the opening of navigation, in the banks between Thorold and Allanburg, by which about 20 feet of bank was swept away; this has been repaired, and the bank, which showed signs of weakness for some distance above and below the break has been strengthened. Navigation has been interrupted, for a short time, three times during the year. On the 9th day of August last the schooner "G. B. Sloan," sank in No. 13 level, interrupting navigation a few hours.

On the 17th day of May last, the bottom of Lock No. 25 was forced up, interrupting navigation for 14 hours. I found it necessary to remove the timbers and planking from the bottom of the lock, since which no serious difficulty has been experienced.

A new bottom will be put in when the canal is emptied next spring. On the 16th day of June last the break in the bank above referred to occurred, interrupting navigation for 34 hours.

Up to the present date there has been no lack of water for navigation and manufacturing purposes this season, and the water now stands in the Pond at Dunnville 20 inches above the level of 1842. The traffic on the canal has been less since the opening up to the present time this season than it was for the corresponding period of last year. The east pier at Port Maitland is in a dilapidated condition, about one hundred feet having been swept out of it near the centre as previously reported. The superstructure should be rebuilt at once, as the whole pier is in danger of being carried away in case of storm. The west pier at Port Dalhousie is also somewhat damaged by the washing away of the foundation, and the filling of the pier at the north end. I have taken no steps to repair it, understanding that it is the intention of the Department to extend it in connection with the new works.

The "Bodwell and Scott's Lock Gate Mitre Lock" put into the head gates at Lock 26, by permission of Department, works admirably, and is a great safeguard against the carrying away of gates by vessels. It takes about 15 seconds to work it, on the opening or closing of the gates.

The following are the more important repairs effected and new work constructed during the year :—

#### **DIVISION No. 1.**

##### *From Port Dalhousie to the foot of Lock 20.*

##### *Lock No. 1.*

One new head gate put in, Harbour Master's house repaired, a new kitchen thereto 12 by 13 feet erected, and fence about premises rebuilt. New flumes and head gates to Laurie's Mill put in, old flume to saw mill repaired. New shute 2 x 6 and 30 feet long for carrying off surplus water at waste weir put in. Towpath bridge 130 feet long 16 feet wide at Weaver's Point replanked, rough tool house and scow for carrying tools and keeping floats in repair built. General repairs to lifting scow made, swing bridge and watch house painted and repaired, double lock house repaired 1,000 yards of earth from bottom of canal at Martindale's Point with a quantity of rock and sunken timber removed.

##### *Lock No. 2.*

New toe post to head gate and general repairs to other gates; swing bridge replanked and raised; bridge approaches and waste weirs above bridge repaired.

##### *St. Catharines Swing-bridge.*

Repairs made to old bridge. In January last a temporary bridge across canal for winter traffic, 210 feet long by 20 feet wide, was built upon piles of heavy timber and double planked with 2-inch plank, old swing-bridge and abutments removed. New double track swing-bridge with sidewalk, on plan furnished by Department of Public Works, under oversight of Mr. Townsend, C.E., with stone piers and abutments, built across canal at foot of St. Paul street. 88 yards of timber towing path, resting upon 28 piles, under and near new bridge, constructed. 30 feet stone wall (cement) 6 feet high and 4½ feet wide, as retaining wall under bridge between abutment and roadway, built, also dry wall 120 feet long, 5 feet high and 6 feet wide, with coping laid in cement at toe approach of new bridge, 150 feet roadway at approaches of bridge macadamized, average depth of 20 inches and 20 feet wide; temporary bridge above referred to, on completion of new bridge, removed. Tow path and bridge carried away by floods at mouth of Twelve Mile Creek repaired, and crib, 18 x 22 x 14 and filled with stones, put into breach; 400 cubic yards of earth removed from canal at this point carried in by the spring flood.

##### *Lock No. 3.*

Rocks blasted and removed from foot of lock, widening and deepening channel, and gates repaired.

##### *Lock No. 4.*

Swing-bridge and lock gates repaired; floats above Lock 4 repaired.

##### *Lock No. 5.*

Swing-bridge repaired, new balance beam on gate and waste weir railing renewed, tow path bridge 14 x 8 feet replanked with 3-inch oak plank.



*Lock No. 6.*

Gates repaired, tow path bridge 16 x 28 feet replanked with 3-inch oak plank, two cribs on heel path side 16 x 16 feet rebuilt, new float 58 x 6 feet built covered with 2-inch plank.

*Lock No. 7.*

Gates and bridges repaired; new culvert under roadway.

*Lock No. 8.*

Gates repaired, one new one put in, floats repaired.

*Lock No. 9.*

Gates repaired, one new one put in.

*Lock No. 10.*

Gates and floats repaired; crib rebuilt at end of float 16 x 16. Lock house repaired.

*Lock No. 11.*

Bridge repaired, 90 feet retaining wall built, waste weirs repaired, wooden aqueduct hydraulic race recaulked.

*Lock No. 12.*

Lock gates and floats repaired, crib work planked.

*Lock No. 13.*

Gates and floats repaired.

*Lock No. 14.*

Two new gates put in; other gates, cribs and floats repaired

*Lock No. 15.*

Lock gates repaired. Swing bridge replanked. Lock-tender's house repaired and fenced.

*Lock No. 16.*

Gates, cribs and floats repaired.

*Lock No. 17.*

One new gate put in and others repaired. Lock-tender's house repaired.

*Lock No. 18.*

Two new gates put in, and floats repaired. Lock-tender's house repaired. 55 yards retaining wall rebuilt.

*Lock No. 19.*

Lock-tender's house repaired and painted. Quarry scow repainted, 50 scow loads of stone, sand and gravel distributed at various points on tow path and banks.

*Gate Yard.*

Eleven gates, six high lift and five low lift, made and deposited in ponds for future use; ten old gates drawn out and cut up. Lifting scow extensively repaired, and two powerful new crabs put on, the old ones having proved insufficient in strength and dangerous to the men working them. 70 wheel-barrows framed, 19 balance beams framed and deposited at convenient points for use in case of breaks. 60 new snabbing posts made and 50 set. Semaphore made and set up at Welland.

## DIVISION No. 2.

*(From foot of Lock 20 to the Junction.)**Lock No. 20.*

Gates and Lock-tender's house repaired.

*Lock No. 21.*

Gates repaired.

*Lock No. 22.*

Gates repaired, and two new ones put in.

*Lock No. 23.*

Gates repaired, new bunting crib built. New head gates and frame put into mill race, also new head gates to McPherson's Mill.

*Lock No. 24.*

Gates repaired.

*Lock No. 25.*

Gates repaired ; new stone wall, 80 feet long, built from bunting crib to waste-weir heel path side. Quaker's bridge removed to Marlatt's and put across canal ; new approaches and new fender work both sides of bridge rebuilt. Higgin's culvert under canal new timbered and planked and lengthened, and banks made up and strengthened. A large quantity of stone and gravel put on banks on three-mile level ; repairing tow path and facing slope.

*Lock No. 26.*

Gates repaired.

*Port Robinson Lock.*

Gates repaired, and slope wall repaired.

*Summit Level.*

Waste weir at Welland repaired, new castings and new screws put in.

## DIVISION No. 3.

*(From Junction to Port Colborne.)*

Large quantity sunken timber and rubbish removed from bottom of canal while unwatered. Floats removed to place of safety out of the way of contractors for the winter, and returned to their place at opening of navigation this spring. Large quantity of gravel used for facing banks on this Division. Stone bridge repaired ; Port Colborne Lock gates repaired, mitre sills spliced, well holes having been worn by chains causing them to bind in working gates, were cut down.

Lock shanty removed out of way of contractors. The cross house moved back on Government ground. Ferry shanty removed. Culvert on west side of harbour to town hall built with stone.

Piers repaired and a number of snubbing posts put in, and temporary office for Collector fitted up.

## DIVISION No. 4.

*(From Junction to Port Maitland and Dunnville.)*

Old stationary bridge across outlet of back ditch near Brown's farm at Chippewa Creek removed, with old breast timber and sheet piling. Bottom structures of new bridge built with mud sills at right angles with streams, planked with two-inch pine plank, sides planked with three-inch oak; top of structure capped with 12 x 12 timber, and sleepers 8 x 12 rest on capping, covered with three-inch oak plank. New bridge 30 feet shorter than old one; approaches faced with rubble stone and lower side faced with gravel and stone to prevent wash; banks of feeder raised at some points, and embankments widened and repaired with stone and gravel at many points where required; culverts cleared of obstructions; back ditch commencing at stone culvert cleaned out for three-quarters of a mile. Marshville and Stromness bridges repaired; all the locks on the division have had considerable repairs. The waste weirs have been repaired, and stationary bridges replanked. A quantity of gravel has been placed on east side of Sulphur Creek bridge to protect mill site from wash of waste weirs.

At Dunnville, on south side of Grand River, a new brick house 34 x 19 feet with wing 24 x 24, has been built for overseer in place of one burned; plan furnished Department; lot on which it stands fenced with post and board fence.

In the spring of this year the bottom of the canal was cleaned out, and all the locks on main canal, except No. 1 were thoroughly cleaned; towpath and banks have been kept in good repair and most of the bridges and lock shanties repainted during the year.

Canada thistles and noxious weeds have been cut to prevent seeding on all the lands of the Department in connection with both the old and new canals. The canal is now in good state of repair and working satisfactorily. By order of Mr. Page a man has been placed on summit level to regulate speed of vessels and detect infractions of canal regulations by fast running, as the new banks are in a comparatively loose state and easily injured by the wash of propellers and tugs running too fast.

I have collected during the year, from the masters and owners of vessels, the sum of \$594.49 in fines for violation of regulations and for damages to works. I append a statement of fines and damages marked A.

I also append a statement marked B, showing the greatest and least depth of water on mitre sills at Port Colborne and Port Dalhousie Locks in each month during the year, also a comparative statement showing the average depth for the month of June, 1877 and 1878, which show that the water has been higher this year for June by 7 inches at Port Dalhousie, and 3 inches at Port Colborne, than for the same month in 1877.

I have the honor to be, Sir,

Your obedient servant,

E. V. BODWELL,

*Superintendent.*

F. BRAUN, Esq., Secretary,

Department of Public Works,

Ottawa.

## WELLAND CANAL.—A.

STATEMENT of Fines and Damages collected from Vessels contravening the Canal Regulations, for the Fiscal Year ended the 30th day of June, 1878.

Date.	Names of Vessels.	Fines.	Damages.	Total.
1877.		\$ cts.	\$ cts.	\$ cts.
May 4.....	From Propeller "Dromedary".....	20 00		
do 4.....	do "Zealand".....	20 00		
do 11.....	Schooner "Elgin".....		58 46	
do 21.....	do "Huron".....		44 50	
do 31.....	Propeller "Clinton".....	20 00		
June 6.....	Schooner "Annie Craig".....		13 00	
do 9.....	Propeller "Columbia".....		8 00	
July 17.....	do "Prussia".....	20 00		
do 18.....	Schooner "H. P. Murray".....		40 00	
do 25.....	Propeller "Ocean".....	20 00		
do 25.....	do "Dominion".....	20 00		
do 31.....	do "Lawrence".....	20 00		
Aug. 4.....	do "Great Western".....		20 00	
do 16.....	Schooner "Montana".....		2 50	
Sept. 11.....	Propeller "Lake Michigan".....	20 00		
do 12.....	Tug "Robb".....		4 32	
do 17.....	Schooner "H. Fichu".....		5 00	
do 22.....	do "Sweden".....	25 00		
do 28.....	do "Olyde".....		35 80	
Oct. 4.....	do "Jennie White".....	5 00		
do 8.....	Scow "Royal Oak".....	5 00		
do 8.....	Propeller "Armenia".....		28 00	
do 18.....	do "Champlain".....		90 91	
do 24.....	Schooner "Antelope".....		35 00	
do 26.....	do "J. J. Pearson".....	4 00		
1878.				
May 26.....	Schooner "H. Dudley".....	10 00		
		209 00	385 49	
1877.				*594 49
Aug. 30.....	Bond taken from owner of Schooner "Sea Gull," for damage done by her to Lock No. 21, and forwarded to Department.....			800 00
				\$1,394 49

\* Handed to H. H. Collier, Esq., Collector, St. Catharines.

## WELLAND CANAL.—B.

STATEMENT showing the Depth of Water on the Lower Sill of Lock No. 1, Welland Canal, for the Fiscal Year ended the 30th day of June, 1878.

Months.	Lower Sill.		Months.	Lower Sill.	
	Highest.	Lowest.		Highest.	Lowest.
1877.	Ft. In.	Ft. In.	1878.	Ft. In.	Ft. In.
July.....	13 5	12 10	January.....	13 0	11 9
August.....	13 2	12 9	February.....	12 8	12 2
September.....	12 10	12 4	March.....	13 4	12 5
October.....	12 7	11 10	April.....	13 7	13 0
November.....	12 3	11 9	May.....	14 1	12 9
December.....	12 4	11 9	June.....	14 1	13 5

## WELLAND CANAL.

STATEMENT showing the Depth of Water on the Upper Sill of Lock No. 27, Welland Canal, for the Fiscal Year ended the 30th day of June, 1878.

Months.	Upper Sill.		Months.	Upper Sill.	
	Highest.	Lowest.		Highest.	Lowest.
1877.	Ft. In.	Ft. In.	1878.	Ft. In.	Ft. In.
July.....	13 3	12 6	January.....	13 0	9 7
August.....	13 0	11 8	February.....	13 0	11 5
September.....	13 1	11 10	March.....	13 11	11 5
October.....	13 7	11 2	April.....	13 4	12 7
November.....	16 8	11 5	May.....	14 1	12 9
December.....	14 3	11 8	June.....	13 6	12 5

	ft. in.
Average depth, June, 1877.....	12 8
“ “ “ 1878.....	12 11

## APPENDIX No. 7.

## BURLINGTON BAY CANAL.

ST. CATHARINES, 24th July, 1878.

SIR,—I have the honor to present my Annual Report upon the working and condition of the Burlington Bay Canal for the year ending on the 30th day of June, 1878.

The canal was closed on the 13th day of December, 1877, and opened on the 30th day of March, 1878.

Since the opening of the Ocean House on the beach near the canal, and of the Brant House near Burlington as places of summer resort, the beach during the warm season is frequented by multitudes of pleasure seekers. The road across the beach has been much improved; last year a subscription of over \$1,000 having been made by the people of Hamilton, Burlington and Stony Creek, the amount was expended in covering the road on the east side of the canal with clay and gravel, forming an excellent road. The traffic across the beach has consequently enormously increased, augmenting largely the labor of the ferry man.

The recesses for the ferry scow have been deepened and enlarged in accordance with plans furnished the Department, and a new ferry scow has been built and fitted with new gearing and is now in use, working satisfactorily. The improvements made to the scow and recesses render crossing less dangerous than before.

The new landings are so constructed that they can be raised or lowered to meet the fluctuations of the water.

The covering to the piers is very much decayed, but as the whole superstructure is rapidly approaching such a condition as to require renewal in the course of two or three years, I do not think it advisable to incur the expense of renewing the planking in the meantime.

The inside of the east pier is settling considerably south of the ferry crossing.

I have the honor to be, Sir,

Your obedient servant,

E. V. BODWELL,

*Superintendent.*

F. BRAUN, Esq., Secretary,  
Public Works Department,  
Ottawa.

## APPENDIX No. 8.

### RIDEAU NAVIGATION.

RIDEAU CANAL OFFICE,  
OTTAWA, 12th October, 1878.

SIR,—I have the honor to submit my Annual Report on the works under my charge during the fiscal year ended 30th June, 1878.

Navigation closed on the 3rd December, 1877, and opened 1st May, 1878.

With the exception of the summit level (Little Rideau Lake) the levels of the water in the different reaches were well maintained.

On opening of navigation in 1877, the summit level was seven inches below navigable height, and owing to the leakages through the lock walls at either end of the locks, gradually fell to only four feet of water on the sill, and boats were compelled to lighten.

At the close of navigation a dam was thrown across the mouth of the lock at the Newboro' end, and stop logs put in at the Narrows, in order to save the water during the winter.

In the spring the Newboro' Lock was unwatered, the wing walls rebuilt and leakage stopped.

From these precautions at the opening of navigation the lake had risen two feet, and so far has kept well up.

A similar treatment at the Narrows Lock, would, I consider, secure good water for the summit level in future.

No break has occurred by reason of any defects in the works, and navigation continued uninterrupted.

The principal repairs executed at the different Stations were as follows:—

#### *Kingston Mills.*

Repairs to block house, and painting Lock-master's house.

#### *Lower Brewers.*

New flanges to lower gates, and fencing out public road from the station.

#### *Upper Brewers.*

Repairs to swing-bridge.

#### *Jones' Falls.*

New gates to fourth lock, small repairs to Lock-master's and Lock laborer's houses.

#### *Whitefish Dam.*

Gravel placed on dam.

#### *Davis'*

Repairs to lock gates, and new chain to locks put in.

*Chaffeys.*

Repairs to Lock-master's house.

*Newboro'.*

Building dams at the head and foot of lock, unwatering lock, taking down and rebuilding wing walls. Repairing and raising protecting pier at foot of lock.

*Narrows.*

Reshingling Lock-master's house; repairs to swing-bridge and masonry.

*Poonamalie.*

Repairs to Lock-master's house.

*Smith's Falls, Detached.*

Repairs to Lock-master's house; new chain to locks and repairs to machinery

*Smith's Falls, Combined*

Repairs to Lock-master's house; strengthening one pair of lock gates.

*Old Slys.*

Repairs to lock gates, and new sluice flumes put in.

*Edmonds'.*

Strengthening lower gates, and repairs to Lock-master's house.

*Merrickville.*

Painting new swing-bridge; fencing and grading approaches to same.

*Nicholson's.*

Swing-bridge painted.

*Burritt's.*

Gravel placed on dam, and repairs to lock gates.

*Long Island.*

New sluice frames put in lock, and repairs to Manotick bridge.

*Black Rapids.*

Flat dam resheeted; clay and gravel put on toe of dam.

*Hogsback.*

Bulk-head painted, and lower gates repaired.

*Hartwell.*

New swing beams put in upper gates, new sluice frame put in, lower gates strengthened, and stone placed on dam at Dow's swamp.



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*Mutchmore's.*

Swing-bridge rebuilt, and approaches fenced and graded.

*Ottawa.*

New sluice frame put in, lower lock gates painted, new coping stones set, and sundry repairs to machinery.

Generally the works are in good working order, and with the exception of preventing leakages at the Narrows, I do not anticipate any heavy repairs.

I have the honor to be, Sir,

Your obedient servant,

FRED. A. WISE,

*Engineer and Superintendent.*

F. BRAUN, Esq., Secretary,  
Department Public Works,  
Ottawa.

## APPENDIX No. 9.

## RIVER TRENT AND NEWCASTLE DISTRICT.

TRENT CANAL WORKS,  
SUPERINTENDENT ENGINEER'S OFFICE,  
PETERBORO', 20th December, 1878.

SIR,—I have the honor to report on the works under my charge for the fiscal year ended 30th June, 1878.

The past fiscal year has been remarkable for an unusually mild winter, the oldest settlers declaring that never during their recollection were the several canals and lakes in the District free from ice so late in the season.

From the commencement of the year to August 30th the water stood at a fair average summer level, but from that date it declined rapidly, and reached its lowest level on October 15th, when it registered 16 inches below low water mark; it then rose with the rapidity of a spring freshet, and attained to mean high water-mark on December 25th. The several canals and lakes in the District being open on this date, one of the steamers of the Peterboro' Navigation Company made an excursion from Peterboro' to Harwood, on Lake Rice; this unprecedented feat no doubt will be remembered and spoken of in years to come.

Having described the works at the several stations in the District in previous reports, I shall now confine myself to laying before you a description of the repairs executed during the year, together with any other information regarding the works that I am in possession of.

*Port Perry,*

On Lake Scugog, is the head of navigation, in a south-westerly direction. No repairs or new works have been executed at this station during the past year. I am informed that a few gentlemen have combined together with a view of obtaining the power to enclose a certain portion of Lake Scugog, with the object of reclaiming land. This scheme may be possible, but it will receive great hostility from all parties interested in the water-power and navigation of the River and Lake Scugog. These gentlemen, I am also informed, will apply at the next sitting of the Local Government, for a charter to enable them to carry out their scheme, but as the Local Government has no jurisdiction on Lake Scugog, it may probably be brought to the notice of the Honorable the Minister, when I shall have an opportunity of reporting in detail thereon.

*Lindsay,*

Situate on the River Scugog, is dependent altogether for its hydraulic power on the Government dam. The works consisting of a lock and dam have received no repairs during the past year. The dam requires to be bracketted each year, in order to retain the water in Lake Scugog at a navigable height.

*Fenelon Falls.*

The slide, piers and booms at this station have received a general overhauling, the old capstans for raising the stop-logs have been removed and crabs erected in their stead, a portion of the slide has been planked, and the booms and anchors adjusted. A petition was forwarded last year to the Department praying that additional piers and booms be constructed in the river for the benefit of the navigation, but no appropriation being granted therefor the improvement was not carried out.

*Bobcaygeon.*

The repairs at this station consisted of the renewal of a portion of the bottom of the locks which was burst up and leaked badly; in order to perform the required repairs it was necessary to pump out the lock chamber. The difficulties to be overcome in so doing were very considerable, owing to the peculiar character of the geological formation in limestone rock cut up with fissures through which the water rushed and defied for a long time all efforts to subdue it.

Cofferdams were constructed where necessary, and three pumps were set to work which eventually overcame the leak and the chamber was pumped dry. Two of the pumps were on the screw principle and each discharged about 3,000 gallons per minute with a lift of 6 feet, each being driven by an engine making 200 revolutions per minute, the pumps running at 400. The third was a centrifugal pump driven by an engine working up to 30 horse-power, and making 180 revolutions per minute, the pump making 160, and lifting 8,000 gallons 5 feet high per minute. The chamber being thus pumped out, the lower mitre sill was found to be forced up 10 inches from the mitre sill platform, and its attachment thereto severed, and also the flooring in many places burst up. The repairs were accomplished, and other defects of minor importance made good in a very satisfactory manner, and the locks were in good working order and ready for the opening of navigation. The accomplishment of these repairs was a source of great satisfaction to the shippers and others interested in the navigation, they being of opinion that the lock could not be pumped out, as all previous attempts resulted in failure. The gates received new quoin knees and the sluice in the south lower gate was renewed,

A new swing bridge was constructed across the canal, in accordance with instructions, and two courses of masonry added to the pier. When the dams are gravelled and the canal walls repaired, the works will present a very creditable appearance.

The detail drawings of the repairs carried out at this station during the past year fully explain themselves.

*Buck Horn.*

The lumbermen having petitioned the Department, praying that in order to facilitate the descent of timber it was necessary to extend the slide about 30 feet, their petition was granted and the work authorized to be carried out. It was completed in accordance with the plan herewith annexed (No. 3.) The dam which maintains the navigation up to Bobcaygeon Lock was gravelled and made staunch last autumn.

The settlers in the surrounding district are anxious to have the water power here utilized in driving a grist mill, and I am informed that application has been, or is about to be made for a grant to use the surplus water. There is at present a saw mill and a shingle mill in operation.

*Burleigh.*

The works at this station require some slight repairs. They have not received any during the past year.

*Lakefield.*

The dam at this station maintains the navigation up to Young's Point Lock, and as that navigation is entirely dependent on this dam, and it being private property, the steamboat owners are about to petition the Department to assume control thereof, and regulate the water for the public benefit. It is in a good state of repair, and the owner thereof would not, I am assured, offer any unreasonable objection. There are three steamboats engaged on this stretch of navigation, and the present management interferes with the public welfare.

*Peterboro'.*

The channel opposite the town wharf is rapidly becoming choked up. It is necessary that it should be deepened during the season of low water, so as to give at least five feet of water.

*Little Lake.*

The booms have received new chains, and two of the piers refilled with stone, the channel at the outlet of this lake and opposite Cemetery Point is also becoming choked up with saw-dust, and must in a short time be dredged out.

*Whitlaw's Rapids.*

The works at this station, consisting of a lock, dams, piers, guide and guard booms, have undergone general repairs. The lock chamber was cleaned (this means an annual necessity in consequence of the saw-dust and slabs from the mills on the river lodging in the chamber) the lock gates were overhauled and painted, the wing dam planked and two new posts and braces fixed, and a new guide boom supplied. A short distance below the cross dam a shoal runs out from the easterly shore to mid-stream and causes a dangerous eddy, which is undermining the abutment pier of the dam, the removal of this shoal therefore becomes a necessity. As this navigable stretch is yearly becoming of greater importance, there being now no less than six steamboats employed on the reach from Peterboro' to Heeley's Falls, it is desirable that a dredge should be built and kept constantly on these waters. I am informed that the Town of Peterboro' would bear a portion of the expense of the construction of a dredge in order to have the improvements opposite the town and in the river carried out.

*Hastings.*

The works at this station have not suffered during the past year with the exception of the dam, which leaks badly, and will take more than ordinary precaution to make it staunch owing to its peculiar construction; it will be necessary to construct a cofferdam at low water across the river, a short distance above the works, at a place known in this vicinity as the "Flat Rock," so that the dam may be laid bare; by this means, not alone can the dam be repaired, but also a channel cut through the flat rock, which is a great obstruction to the navigation at low water season. In my report for the year ended June 30th, 1877, after making a careful examination of this portion of the river, I described in detail the result of my examination.

The boulders that rested on the flat rock below the lock and at the tail of the canal have been removed, also the channel about two miles below the rock has been cleaned so as to give free navigation for vessels of five feet draught at low water.

*Heeley's Falls.*

The dam here maintains the navigation up to Hastings. It has been slightly injured during the past year, the pier at its vertex being undermined. This should be repaired at the first favorable opportunity, as any breach in this dam, which to a great extent depends for its security on the solidity of this pier, would be the means of stopping the navigation from here to Hastings, and which will become of great importance next season in consequence of the completion of the Grand Junction Railway to Campbellford.

I would also recommend that the present guide boom be extended 180 feet, so as to direct drift wood etc., into the slide, thereby preventing it from passing over the dam and injuring it, which at present is the case.

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*Middle Falls.*

No repairs have been executed at this station during the past year by the Department, the dams, slides and booms being maintained by a committee of lumbermen.

*Chisholm's Rapids.*

In order to make the lock at this station fit for use, which in its present condition it is not, it should receive new gates.

These repairs are required to open up the through navigation between Frankfort and Meyersburgh. The removal of the dam at this station was spoken of this spring, as it was the cause of damaging a quantity of low land adjoining the river during high water. I may here state that for such damage the land owners, at the time of its construction, received compensation from Government, the amount being decided upon by arbitration, but apart from that, if the dam were removed the lock and canal, which are of first-class work, would forever become useless, the hydraulic power now in operation ruined, the navigation from Chisholm to Meyersburgh a thing of the past. The extensive lumber merchants at Trenton and elsewhere would, in all probability at season of low water, be unable to get the "drives" to their mills, and by laying the marshes dry, which by exposure to the sun's rays must, as a matter of course, emit ague and lake fever miasma to such a degree as would render the surrounding country most unhealthy.

In conclusion I would most respectfully add that the entire navigation of this extensive District is annually becoming of greater importance, and as the management of the tributaries is not directly under the control of the Department, it would be advisable for the better regulation of the water levels, that it assumed such. Grievous complaints have been made by the public and the local journals of the manner in which the regulation of the water in the main tributaries is conducted.

Any trifling with the supply in the tributaries, is, as a matter of course, felt on the waters under my control, and I must protest against it strongly.

The regulation of the water on these tributaries is conducted by the Local Government, and I am not aware that it has any jurisdiction over the navigable waters of the Dominion.

I am informed that actions at law are about to be proceeded with against the Local Government for the manner in which it regulated the water last season.

I have the honor to be, Sir,

Your obedient servant,

THOMAS D. BELCHER,

*Superintending Engineer.*

F. BRAUN, Esq., Secretary,  
Public Works Department  
Ottawa.

## APPENDIX No. 10.

### SLIDES AND BOOMS—OTTAWA DISTRICT.

#### OTTAWA RIVER WORKS.

OTTAWA, 2nd October, 1878.

SIR,—I have the honor to report on the repairs and additions made to the works on the Ottawa and its tributaries under my charge, during the fiscal year ended 30th June, 1878.

#### RIVER OTTAWA.

##### *Union Suspension Bridge at Chaudiere Falls, Ottawa.*

Fully two-thirds of the skein wires damaged by rust were removed and replaced by new ones.

The planking on roadway was renewed throughout and the side railings repaired where considered necessary. The doors and windows of the Gatekeeper's house were also repaired, and the plank sidewalk extended to the bridge. The cables, skein wires and bridge superstructure generally received two coats of best white paint.

##### *Public Roadway Bridge over Hull Slide.*

The whole of the planking on the roadway of this bridge was renewed.

##### *Hull or North Chaudiere Station.*

The east pier of the second slide was extended 30 feet, filled with stone and faced with maple plank laid diagonally. Repairs were also executed in the bottom of the first slide and on the apron where damaged.

##### *Ottawa or South Chaudiere Station.*

The north side pier of the second slide was extended downwards about 90 feet. The timber foundations, cross and longitudinal, were increased in such a manner as to cover the rocky bottom between the first and second drops of the slide and well covered with plank. Repairs and partial renewals of the oak sills, fingers and binders of the adjusting apron at second bulk-head were also carried out, and renewals made of the planking of the slide generally where required.

It was found necessary to build a new governing bulkhead with crabs, platform, stop logs, &c., on the south side of lower slide below the tail race, from Messrs Bronson & Weston's Mills. The booms and piers at the entrance to the slides and basin were repaired.

##### *Chats Station.*

The cross sills in lower end of slide where damaged and decayed were renewed, and such work performed on the curve and canal as had a tendency to make the improvements at this place efficient for the season.

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*Cheneaux Boom.*

A new anchor pier had to be substituted for one wrecked in the spring and afterwards a number of boom chains had to be provided to insure the safety of the booms.

*Portage du Fort.*

A small side dam between the slide and the main shore was stone filled and planked on front; and at the same time, the side timbers and upright planking on boom piers were made good where found deficient.

*Mountain.*

A considerable renewal of the damaged and decayed parts of the side pier at the outlet of the slide had to be undertaken and nothing less than a strenuous effort by way of stone filling, spiking the timbers together and lining the outlet pier at the foot of the chute with hardwood would have kept the works together; it may also be mentioned that certain planking was done in the slide bottom and that the upper bulkhead platform was renewed.

*Calumet Station.*

The planking here and the damaged and decayed sills were removed from the bottom of the slides. The 1st and 2nd bulkhead platforms were provided with new stairways, and white oak stop-log checks placed in the bulkheads. The second pier on the outside of the slide was rebuilt. The top portion of the large boom pier at the upper entrance, where damaged and decayed, was strengthened and stone filled. Much was accomplished at this Station by way of patching and removing loose stones and boulders from the outlet of the slides.

*Des Joachim Station.*

At this place no great outlay was required in preparation for the running season of 1878, but it was deemed advisable to construct a small dam in the basin, at the head of the Island, to guard against waste of water, and the planking of a portion of the slide bottom was not overlooked.

*Rocher Capitaine Station.*

A quantity of loose stones was removed from the reach between the 1st and 2nd bulkheads and a breach closed in an upper side dam near the bulkhead.

## TRIBUTARIES OF THE OTTAWA.

*Du Moine.*

It was found necessary to remove a small sand bar which had formed at the head of the Island; and a break in the boom had to be made good.

*Petawawa.*

The booms at the entrance of the long slide, which had been carried away by the spring freshet, were replaced. New chains of greater strength were provided, and renewals of the bents, posts and planking of the slide effected where required.

The outlet pier, near the foot of the crooked chute slide, was repaired, as were also the piers at the entrance. The sills and posts in the body of the main slide, where decayed and damaged, were removed and the slide bottom planked throughout. A boom pier was built above the slide and the cribwork generally filled with stone.

At the four slides near the mouth of the river, the bents, posts and planking were repaired where found damaged or decayed.

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*Coulonge.*

The planking of the bottom and sides of the long slide, where found deficient, was removed and new material substituted, and a deposit of sand was cleared from the entrance.

*Madawaska.*

At Arnprior two of the bulkhead piers of the slide which had become insecure were removed and rebuilt from their foundations, and such other repairs executed by means of stone filling piers at the side of the slide and in the basin as required, these precautionary measures to keep the works in their place. A new bulkhead, posts and crab frame were also provided for this Station.

*Gatineau.*

Here new guide booms for drift wood were made, boom caps and pickets furnished and strengthening chains put on the booms as occasion required.

I have the honor to be, Sir,

Yours obedient servant,

GEO. P. BROPHY,

*Superintendent Engineer.*

F. BRAUN, Esq., Secretary,  
Public Works Department,  
Ottawa.



## APPENDIX No. 11.

### SLIDES AND BOOMS—ST. MAURICE DISTRICT.

ENGINEER'S OFFICE,

MONTREAL, 1st. Oct., 187

SIR,—In compliance with your instructions, No. 46,168 of the 27th ultimo, I have the honor to submit the following Report for the fiscal year 1877-'78, on the St. Maurice District Works.

The general management of these works having been entrusted to me since the death of the late H. R. Symmes, the Local Superintendent, 8th October, 1875, I placed them under the supervision of J. B. Normand, whom, on account of his ability and long experience upon the works during the past 25 years, I considered the most competent to take the local charge of the same, subject to my instructions, as previously stated in my Report of the 21st of last January.

Various questions having arisen with respect to the works, Federal Government lands, staff, slide regulations, tariff and other matters, I furnished the Department with detailed reports thereon, for future reference and guidance, viz:—

On 26th November, 1877, respecting works to be abandoned or maintained;  
On 29th January, 1878, respecting lands belonging to Federal Government;  
On 31st January, 1878, respecting staff and laborers employed at each station;  
On 20th February, 1878, respecting slide regulations, tariff, traffic and revenue;  
On 1st February, 1878, I furnished a complete series of plans of all the works with a general statement showing their nature, situation and condition.

The works executed during the fiscal year were principally the repairs and construction of piers, booms, dams, &c., on which a sum of about \$6,200 was expended.

#### REPAIRS.

##### *Mouth of St. Maurice.*

The booms were all placed and ready to receive logs on the 17th day of April, at least three weeks earlier than in previous years. They are generally in good condition.

Seventeen (17) piers were raised 3 feet higher so as to lessen the danger of working the booms during the spring freshets.

Fifteen (15) additional piers yet remain to be raised for the same reason.

##### *Shawenegan.*

Renewal of slide bottom with hard wood for about 100 feet in length.

Sheeting of long wharf near foot of falls partly renewed.

Sluice-way gate through bulk-head of slide renewed.

Repairs to 4 piers 12 x 12 x 5 feet high.

"	1 pier	20 x 20 x 19	"	"
"	1 "	20 x 20 x 8	"	"
"	1 dam	155 x 12 x 7	"	"
"	1 "	45 x 12 x 7		

## CONSTRUCTION.

*Shawenegan.*

The booms in use at this Station during the past 20 years, or longer, have been partly renewed, viz:—

1,025 feet of booms,	5 feet wide and 14 inches thick.
340    "       "	34 inches wide and 12 inches thick.
60     "       "	4 feet wide and 12 inches thick.

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1,425

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13,912 lbs of chain varying from  $\frac{3}{4}$  to  $\frac{7}{8}$  of an inch were procured for fastening these and other booms, the former chains in use being unsafe. 10 mooring piers of 13 x 13 x 6 feet in height had to be built for additional security of the booms.

*Iroquois Falls.*

A dam was constructed on the Island at the foot of the fall, of 45 x 18 x 19 feet in height to divert the course of the water at that place, and 300 cubic yards of rock were removed from the channel near the fall, so as to facilitate the descent of saw logs, and to prevent as much as possible their accumulation and grounding in the Vermilion Tributary whereon the Iroquois Falls are situated.

Of all the work executed on the St. Maurice, a portion was done by days' work, amounting to.....	\$3,542 71
And another portion, under a tender by Mr. Joseph Lajoie, amounting to.....	2,690 17

The whole being a sum of..... \$6,232 89  
As authorized by No. 41,625, 1st October, 1877, and No. 43,210, of the 16th February, 1878.

## WORKS REQUIRED.

These may be enumerated as follows, viz:—

*Mouth of St. Maurice.*

Raising 15 piers from 2 to 3 feet higher, and slight repairs to booms and buildings, &c.

*Shawenegan.*

Completing renewal of old booms according to my Report and estimate of 24th September, 1877, only one half of the work being done.

Reconstructing decayed portions of slide, and substituting hard to soft wood for bottom of the same, as the latter gets worn out.

These works are now in progress and will be proceeded with so far as the appropriation will permit.

*Petites Piles.*

Two side dams or glancing piers have been applied for, to prevent the logs from grounding or being shattered during certain stages of the water on the rough rocky point at this Station.

*Grand Mère.*

A dam of rough timber across entrance of former slide, about 140 x 32 x 15 feet is much wanted here to prevent logs from being carried through the slide channel, which is exceedingly rough; any timber passing here is much damaged by the projections of the rock on both sides of the channel.

This work is being proceeded with.

### *Grand Piles Dam.*

This dam has been seriously damaged by floating ice, timber jams and otherwise since it was completed in the spring of 1876. Portions of it have been carried away down to the bed of the river.

Steps are being taken for the repairing of this work which has been authorized during the past summer; but the water has hitherto been so high and the current so swift, that it is only lately that soundings could be taken to determine the real extent of the damage done, and the quantity of timber and stone required for the work.

My estimate of the 19th of last January, for the repairs to and partial reconstruction of this dam, amounted to \$6,685.

Since this estimate has been furnished other portions of the work have been damaged or carried away.

The dam, as originally built, has neither sufficient width of base nor weight, and must therefore be widened when it is repaired, otherwise it is not likely to withstand for any length of time the immense pressure of water it has to encounter in the spring of the year, when the water sometimes accumulates to a height of from 20 to 30 feet above it.

### *La Tuque.*

A single boom of about 300 feet in length, 20 x 10 inches, is required here for closing the mouth of the Rivière des Bostonais tributary. This work has been ordered to be done, having been already authorized.

### WORKS ABANDONED.

#### *Iroquois Falls.*

On the Vermilion, some 122 miles above the mouth of the St. Maurice.

These works consisting originally of a slide, booms, dams and piers, were built towards 1858, by Messrs. Broster, Gouin, Quinn, &c., lumber merchants, and were subsequently sold by them to the Government in May, 1866, since which time they have been improved and extended.

As there appeared to be no just reason, so far as I could ascertain, why the works on this tributary should be maintained at the expense of the Government, when those on the other tributaries were and are still maintained at the expense of the lumber merchants themselves, I recommended in my Report, No. 71,017 of the 26th of last November, that they should be abandoned to the care of the latter.

This Report having been approved of, the parties interested in those works were notified accordingly; and such portion of the tools and plant as were useful for other Stations on the main trunk of the river were removed to the store house at La Tuque.

#### *La Tuque Falls.*

100 miles above outlet of St. Maurice.

The works here, consisting chiefly of 4,000 feet of retaining booms and 15 piers connected with the same, have also been abandoned in accordance with my suggestions in the same Report.

These works have been of little service to the descent or retention of timber, being located so as to keep the logs between the booms and the east shore, which is low, and whereon the timber grounds; their position should have been reversed so as to conduct or retain the logs near the west shore where the banks are high.

### TRAFFIC.

About 300,000 logs, it is estimated, passed through the booms this year, and it is thought that few or none will be left at any place on the river.

The booms were never placed so early in the spring before, nor was the driving of the logs ever done so quickly or so easily as this year.

#### LAND.

As the Federal Government does not hold all the land requisite at the various Stations in connection with the existing works, as stated in my Report of the 29th of last January, the necessary measures are now being taken to secure possession of the same from the Provincial Government.

#### STAFF.

Before the St. Maurice works were placed under my management, several persons were employed in doing work connected with the descent of timber, which, according to the Slide Regulations of 17th of May, 1865, devolved on the lumber merchants.

I gave Mr. Normand the necessary instructions to diminish the staff, so far as practicable, in accordance with the regulations and the requirements of the several Stations, which has been carried out.

In my Report of the 20th of last February, respecting the staff, I stated that the services of Mr. François Rousseau, the slide-master at Shawenegan, and those of Joseph Blondin, boom-master at La Tuque, and François Lacroix, boom-master on the Vermilion tributary, could be dispensed with, and recommended that they should be superannuated.

#### SLIDE REGULATIONS.

The regulations in force, until last summer, were those of the 29th April, 1854, which were enacted shortly after the completion of the works.

Although they were repealed by the subsequent code of regulations of the 17th May, 1865, no portion of the latter was applied to the St. Maurice works, until I gave instructions to that effect, in accordance with my authority from the Department.

#### SUPERINTENDENCE.

Since Mr. Normand has been placed by me in charge of the works, he has discharged all his duties with great care and ability.

The general superintendence of these works, as recommended in my Report of the 31st of last January, concerning the staff, should be placed under the Engineer who has the general charge of the canals in the Province of Quebec, such being, in my opinion, the best mode of checking and regulating the yearly expenditure.

I have the honor to be, Sir,

Your most obedient servant,

G. F. BAILLAIRGÉ,

*Assistant Chief Engineer, Public Works.*

F. BRAUN, Esq., Secretary,

Department of Public Works,

Ottawa.

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## APPENDIX No. 12.

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### SLIDES—SAGUENAY DISTRICT.

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SAGUENAY, 8th October, 1878.

SIR,—I have the honor to submit my Annual Report on the works under my charge for the fiscal year ended 30th June, 1878.

All the works have been in good order this season.

The repairs made in the spring have been very useful in facilitating the passage of timber, as well as the repairs made to the slide, which were indispensable.

The booms in Lake St. John are in good condition, and in place of the one which was burned, Messrs. Price Brothers and Company have stretched a boom to prevent timber from taking the wrong channel, which has proved successful. I do not think it will be necessary to rebuild the boom.

The boom and bulk heads at the head of the slide are also in a good state of repair.

I have the honor to be, Sir,

Your obedient servant,

D. BOULANGER,

*Superintendent.*

F. BRAUN, Esq., Secretary,  
Public Works Department,  
Ottawa.

## APPENDIX No. 13.

### HARBOURS ST. LAWRENCE AND LAKES.

OTTAWA, 24th September, 1878.

SIR,—I have the honor to report upon the Harbour Works and Surveys of the last fiscal year.

#### RIVER ST. LAWRENCE.

##### *Matane.*

Matane is situated on the South Shore of the St. Lawrence, 240 miles below Quebec.

An examination was made of these waters to determine their capabilities for the formation of a harbour of refuge.

Sea-going vessels engaged in this navigation will hereafter be of two classes vessels discharging at Quebec, at present exacting 30 feet at lowest stage of water and vessels navigating the canals, which, when the navigation is established at 14 feet of water on the sills, will require a depth of from 17 to 18 feet.

It must be obvious that a merely tidal harbour will ill-satisfy the provisions called for at this spot for the protection of shipping. For it is in this vicinity that many of the shipwrecks of the last half century have taken place, and these waters are therefore held to be a dangerous section in the navigation.

In order to obtain a depth of 18 feet a distance of 2,900 feet from the spit protecting the inner harbour has to be considered. The distance to be traversed to obtain a depth of 30 feet is 5,100 feet.

The inner basin would also require to be dredged to the requisite depth.

Consequently the expense of creating a harbour of this character will be serious.

It was determined, accordingly, to construct a landing pier, and a sum of \$10,000 was placed in the estimates.

Application was made by the inhabitants of Matane, who had formed themselves into a syndicate, to construct the pier by time work according to the design of the Department and under its direction. As it was considered that a year's time would be gained, that the cost would be reduced to a minimum, and the work efficiently constructed, this request was entertained, and the authority has been given for the work so to be carried on.

Arrangements are being made in accordance with these conditions, and it is anticipated the work will be completed this fall.

The pier designed will be 480 feet in length carried up 6 feet above high water line.

It is to consist of 5 cribs 15 feet wide, and 4 cribs 30 feet wide, placed at intervals of 25 feet, the end crib being 60 feet in length, making a total length of 480 feet. The main width of the pier will be 30 feet.

##### *River Blanche.*

River Blanche is situated between the Rivers Tortigoux and Matane, about 20 miles east of the River Metis and nine miles from Matane. A mooring crib 60 feet by 24 on the surface was completed in 1876, but owing to the limit of the appropriation, the height at which it was completed was low and it was found too limited in area.

An appropriation of \$3,000. was made at the last Session of Parliament for its enlargement.

Owing to the nature of the work, it not being possible to give it out by contract, it has been determined to make the addition by days' work.

It is proposed to increase easterly the present pier to 60 feet in length at top, with a slip in the middle on the shore side. Further, to make the new work 3 feet higher than the crib first constructed; the old work being also taken up to that level. The work will be immediately commenced and will be completed in the fall.

#### *Bic.*

Instructions have been given to complete the survey commenced in 1876. This work will be done during the fall.

#### *River du Loup.*

River du Loup is 108 miles below Quebec, on the south shore of the St. Lawrence.

Owing to the representation of the low level of the wharf, and of the difficulty experienced by passengers landing during heavy seas, it is intended to raise the lower end of the wharf this season, and to cover it with plank. The heavy seas are found continually to wash away the material with which the roadway is made, destroying the surface and causing frequent expense. The only real protection which can be given is plank covering. The portion raised in level will accordingly be thus protected. Another season will be required to complete the work.

This work is of such a character that it is hardly possible to place it under contract without loss and embarrassment to the Department. No specification can clearly set forth the obligations of a contractor, and under any contract the disputes on this point would be frequent and harassing. It has accordingly been determined to make the restoration by time work. This remark indeed generally applies to the restoration of all the Quebec piers. In works of demolition and restoration it is not practicable to limit the contingencies under which the performance of work can be claimed as an ordinary obligation of the contractor.

The consequence has been that these works are being performed by time work under a Superintendent. The result has proved satisfactory. The work in question will be completed this fall.

#### *River Ouelle.*

River Ouelle is 75 miles below Quebec, on the south shore.

This pier has been periodically subjected to the destruction of the roadway, owing to the frequent storms which are experienced throughout the year, and from time to time expense is called for to replace the stone carried away. It has therefore been determined to protect it by plank covering, the sidewalks being already so constructed.

Arrangements are being made for the work to be carried on, and it will be completed early in the fall. It will be executed by time work.

#### *St. Jean Port Joli.*

St. Jean Port Joli is on the south shore of the St. Lawrence, 55½ miles below Quebec.

This pier was partially built by the Syndics of St. Jean Port Joli expending \$2,000 on their own account, the work being carried on under their own directions. A further sum of \$2,000 was expended during the last fiscal year by the Syndics, under the direction of the Department, in the construction of an additional crib, 60 feet in length, increasing in width at the end to 40 feet, which gives a depth of 11 feet 6 inches at half tide.

It was considered upon examination that the original pier was insecure, and that additional work was absolutely necessary to make it safe.

Instructions have been given for this necessary work, and it will be at once commenced. It will be completed during the fall.

The pier is 232 feet long and generally 20 feet wide.

*L'Islet.*

On the south shore of the St. Lawrence,  $46\frac{1}{2}$  miles below Quebec.

This pier, which was completed in 1855 at an original cost of \$113,343.27, is 1104 feet in length.

The restoration of this work has been carried on during the season, and the south portion, which was below the required level, has been raised to the required height.

The work of restoration was commenced in 1876, and was carried on to the close of the season of 1877. It was resumed at the commencement of the present working season. It will, without doubt, be completed at the close of the year. The pier will thus have been restored throughout and brought up to the required height.

It is intended, also, to cover it with plank on the whole length to guard against the destruction of the roadway, which is more or less annually experienced.

The repairs were made by time work.

When this pier shall have been placed in proper condition it will probably require few repairs for the next 30 years.

*St. Thomas, Montmagny.*

Is 30 miles by water and 48 by rail from Quebec.

St. Thomas, Montmagny, is the most important village between Quebec and River du Loup.

Messrs. Price Bros. & Co. have extensive saw mills at this place, where they load annually about 10 vessels with deals for Great Britain. The lumber is taken out in bateaux to the vessels anchored in deep water.

Instructions have been given for a survey to determine the cost of constructing a landing place.

A steamer runs tri-weekly between Quebec and Montmagny. It draws but 5 feet of water, and can only enter the basin at half tide.

*Berthier.*

Berthier pier is  $24\frac{1}{2}$  miles below Quebec on the south shore.

Some slight expenditure will be required to protect the corners of the pier with sheeting.

The pier will then have been placed in thorough repair. It will require in all probability but few repairs for the next quarter of a century.

*St. Laurent, Island of Orleans.*

St. Laurent is on the south shore of the Island of Orleans, between 10 and 11 miles from Quebec.

Instructions have been given to repair the flooring of this pier, and to make other repairs which may be found necessary.

*River Saguenay.*

An examination has been ordered to determine the site of a landing pier at St. Anne, opposite Chicoutimi.

The survey will be made before the close of the season.

## LAKE ONTARIO.

*Black Creek.*

Black Creek has its outlet in South Bay, Prince Edward County, Lake Ontario. Six miles from its mouth the thriving village of Milford is situated, being seven



miles south of Picton, on the Bay of Quinté. The creek is at present only navigable for vessels drawing six feet of water up to the drawbridge three-quarters of a mile from the mouth.

It is stated that above the bridge the average depth for two miles is about six feet, but that the channel is crooked, and that from this point the creek is so tortuous, and the channel so narrow and full of weeds, that it is not without difficulty a boat drawing 2½ feet can pass up.

A survey has been ordered to be made of this place.

#### *Picton.*

Additional dredging is required at this harbor and will be immediately commenced.

It is proposed to remove the old pier at the outer limit of the harbor, and make the entrance 75 feet wider. Further, to give 50 feet of additional deep water to the channel opposite Brick Kiln Point, so as to straighten the entrance, 10 feet being a depth to be obtained.

At Low's Cove the winding basin is also required which may be used with great advantage for laying up vessels during winter.

It is anticipated the work will be completed this season.

#### *Belleville.*

Dredging is required at this harbor.

It is proposed to remove the shoal south of the approaches of the harbor so that the entrance may be beaten into by sailing vessels.

Some *debris* which is believed to be bark and sawdust requires to be removed from between the piers in the eastern portion of the harbor. The bottom, however, which is rock, has been reached by the dredge and can only be deepened by an explosive.

It is anticipated the work will be generally completed this season.

#### *Trenton.*

At the head of the Bay of Quinté and 6½ miles from Belleville.

The sum of \$4,000 was expended during the season of 1877 in dredging a channel 100 feet wide through the shoal at the entrance of the harbor, 2,100 feet in length.

The approaches to the wharves were also partially dredged, a portion of the expense being borne by the proprietors.

#### *Weller's Bay.*

Weller's Bay is one of the bays of Lake Ontario, 6 miles east of Presque Harbor to the west of the peninsula of Prince Edward County. At the head of Weller's Bay is situated the Village of Consecon, from which port over 200,000 bushels of grain, principally barley, is shipped annually to the United States.

The Bay is about 5½ miles long, the average depth of water is about 20 feet. A shoal about half a mile in length exists at the entrance of the Bay, which is a matter of complaint as impeding the navigation.

Obstructions also are said to exist near the Village of Consecon where the grain elevators have been constructed.

Instructions have been given for the examination of the shoal and the other reported obstructions, in order to determine the cost of the improvement of navigation.

#### *Newcastle.*

On Lake Ontario, is 47 miles east of Toronto. A sum of \$5,000, voted by Parliament in 1877, has been expended in dredging the harbor to 10 feet. The work was carried to the warehouse owned by the Harbor Trust.

It was commenced on the 30th July, and completed on the 18th October, during which time 26,247 cubic yards were excavated.

The dredging was carried on by the Harbor Trust, under the superintendence of the Department, the Trust making a large expenditure from its funds in the construction of cribwork on the western pier at its northern end, for the protection of the harbor.

### *Pickering*

Pickering is situated on Lake Ontario, 21 miles east of Toronto. This harbor is formerly known under the name of Frenchman's Bay, but is now described as Pickering Harbor.

Last Parliament an appropriation of \$5,000 was voted for its improvement.

It is proposed to increase the western pier 60 feet in length, at a depth of 14 feet, and to dredge the approaches to the harbour and the neighbourhood of the new pier to that depth to the extent the balance of the appropriation, after the cost of the cribwork, will admit.

The work will be immediately placed under contract, and it is anticipated it will be completed this year.

### *Toronto.*

Dredging at the western entrance was carried on during the season of 1877, until the 23rd Nov., and was resumed this present year on the 21st May, and carried on until the close of the fiscal year.

The present design is to obtain a channel 300 feet wide and 14 feet deep, and to continue the work of dredging easterly and westerly until that depth in the harbour proper and in the lake is met.

On the eastern side the requisite depth will be obtained in about 1,200 feet, at the termination of which distance the width of the channel is increased to 400 feet.

On the western side a new and improved curved channel running in a south-westerly direction extending for about 1,800 feet will be increased at its mouth to 500 feet. The work to obtain this result has been steadily carried on the whole of the last fiscal year, and will be prosecuted during the ensuing season.

It is anticipated at the close of the present year there will be a continuous channel of 250 feet wide westerly to the Queen's wharf and 125 feet wide parallel to the Queen's wharf, so that through the whole of this extent, vessels requiring 4 feet draught can enter the harbor.

The remaining width opposite the Queen's wharf will likewise be deepened to the rock *in situ* which itself must be removed by explosives to obtain the required depth.

The work is not being carried through sand, the wash of adjoining heights. On the contrary, the bottom consists of rock covered by stiff blue clay in which boulders are met many of them of large size protruding above the general level. The excavation accordingly is found to be somewhat hard cutting. The rock has been moved by an explosive.

The work, however, this season will not be fully carried out to the extent designed. In view of the increased depth of the Welland Canal, it is essential to the status of Toronto, that the full width of channel be obtained, so that on the opening of the new Welland Canal, Toronto be not placed in a less advantageous position than other harbors of its class.

The improvement of the channel to the west, by which the approach has been made easier, will admit a sailing vessel entering the harbor with any wind, when the full width of the channel parallel with the Queen's wharf shall have been obtained.

### *Burlington Bay Canal.*

This canal connects Burlington Bay with Lake Ontario.

It is half a mile in length; the general width is 130 feet, and there is a narrow section of 108 feet in width.

An examination of the waters was made in June, 1878. The average depth is 12 feet, but for 400 feet there is shallow water which is but 10 feet deep.

The obstruction is found to be caused mainly by the remains of an old wharf. It has been determined to attack it, in the first instance by divers and a hoist scow as the least expensive proceeding. After these operations it will be seen if further dredging is necessary.

#### LAKE ERIE.

##### *Port Stanley.*

Port Stanley, the lake outlet of a large grain-growing district is 85 miles west of the entrance of the Welland Canal, and 8 miles south of St. Thomas. It is connected by railway with the Great Western Railway system. The Railway Company likewise controls the harbor and inner basin.

A survey was made in the season of 1877 to determine the condition and depth of the harbor. Between the piers and up to the Great Western Railway Company's Elevator, the general depth on the west side is 11 feet at low water. On the east side near the elevators the depth of water is hardly 8 feet.

The Railway Company received at this port in the season of 1877 about 35,000 tons of coal, and about 400,000 bushels of grain were shipped from this port during the season.

##### *Rondeau.*

Rondeau is a harbor of refuge on Lake Erie. Its entrance consists of two parallel piers 783 feet in length and 250 feet apart.

An examination of this harbor was made in October, 1877, and partially of the inner sheet of water known as the Rondeau. A limited area in the neighborhood of the piers has been dredged to a depth sufficient to receive vessels navigating Lake Erie when requiring shelter in stress of weather, and to furnish protection and anchoring ground.

The basin at the termination of the works in 1873 had an area of 10 acres with an average depth of 16 feet. The survey has determined that no change has taken place as regards the depth of water between the piers (20 feet), but that the basin has filled up to some extent. This result has been caused by the line of sand bank on each side of the piers having been burst open by the heavy seas of the Lake, much of the material having been carried into the excavated area.

Soundings have been taken in these gaps so that an estimate may be prepared of the cost of crib-work to withstand the roll from the lake and the subject is now under the consideration of the Department.

#### LAKE HURON.

##### *Bayfield.*

Bayfield is 12 miles south of Goderich on Lake Huron.

At the termination of the contract the work of dredging this harbor to the necessary extent and depth was left incomplete, owing to the limit of appropriation not admitting further prosecution of the work. The Departmental dredge has therefore been detailed to the duty of removing the shoal on the south side of the entrance to the harbor, and to continue the dredging on the line of the north pier to the deep water, thus to obtain a greater extent of harbor accommodation.

Further, to remove the point of sand within the harbor, to admit of the formation of a turning basin 200 feet wide.

This harbor when completed will have a depth of 10 feet.

The work was commenced last fall, and it is anticipated that the work will be finished early in August.

*Kincardine.*

Kincardine is situated at the mouth of the River Penetangore, 31 miles north of Goderich, on Lake Huron.

The wharf which was damaged in the storm of 1876 has been restored, and the superstructure which was of low level at points of the pier has been brought to the required height.

Great energy was shown by the contractors, Messrs. McLaren & Walker, in performing their work. The nine cribs were all sunk in the fall of 1877, an amount of work which could only have been performed by diligence and good management. This result removed great cause of anxiety which would have arisen had this opening remained unfilled by the new crib work during the winter.

The superstructure is now on the eve of completion, and will in a few days be thoroughly finished.

The north pier is now in excellent preservation, and will not require repairs for some years, unless from direct injury.

The channel into the harbor having become obstructed by a deposit of material, on the opening of the navigation the Beatty Line of Steamers were unable to enter. The Government dredge was ordered to remove the obstruction, and the necessary work was done between the 26th of April and the 25th May, 1878, and the harbor was then left free from any obstacles to navigation.

The importance of this harbour has led to instructions being given for the dredge to be moved here when the works at Bayfield are concluded.

The south pier is still in an unsatisfactory state; its condition is under consideration by the Department.

## GEORGIAN BAY.

*Collingwood.*

Collingwood is situated on the Georgian Bay, and is the northern terminus of the Northern Railway from Toronto. It is a harbor of importance owing to the extended grain trade between the port and Chicago. There is likewise a large lumber trade, and much local business.

Vessels drawing 11 feet of water can enter this port. But the increase in the draft of vessels in the Lake Superior trade makes this depth insufficient—14 feet being the depth now required.

A survey was made early in the year to determine what works are needed to increase the accommodation of the harbor. An appropriation of \$10,000 was also made for this purpose at the last session of Parliament. It is proposed to organize a small party, with divers and lift scow to remove the boulders which are to be found at the entrance to the harbor and in the channel, and which are reported as interfering with the entrance of vessels.

On the removal of these obstructions a dredge will be placed to attack the more shallow spots in the channel, and to extend the greatest assistance practicable.

The harbor is greatly affected at the period of northern and north-easterly gales by the roll of waters through the gap between the present breakwater and the western shore. To obtain quiet water on these occasions this gap should be closed by cribwork.

The same remark applies to the western entrance; it is much exposed, and equally requires protection. Indeed, until the area of the harbor is by these means *à l'abri* of the rough and tempestuous waters of Georgian Bay, shipping will be constantly exposed to damage, for but little protection is now given to it.

The area of dredging in the harbor is of some extent. The water in the neighbourhood of the wharves has also become somewhat shoally, and the deposit requires to be removed.

*Meaford.*

Meaford Harbor is on Georgian Bay, 18 miles west of Collingwood, and 20 miles east of Owen Sound.

The harbor consists of a pier 600 feet long, with an arm in a north-easterly direction for 200 feet affording protection against the north-westerly wind prevalent here.

A breakwater 400 feet long was constructed in 1875 on the east side of the river which has its discharge between the piers.

An examination made in May, 1878, shows that dredging is necessary to give the depth required, and to remove the material which has been deposited here.

The old portion of the western pier is not in good condition.

*Owen Sound.*

Owen Sound is at the mouth of the River Garafraxa, and is the shipping port for that section of the country.

Steamers for the North-west run to this port, Owen Sound being the northern terminus of the Toronto Grey and Bruce Railway.

An examination was made in June to establish the amount of excavation necessary to obtain a 13 feet navigation.

Soundings were taken over the whole length of the shoals, and the river was surveyed up to the second bridge.

It is intended to relieve the shallow portion of the river, in the first instance, and afterwards to obtain a through channel for larger vessels.

13 feet is now called for when but a few years back 10 feet was all that was necessary.

Hence some difficulty arises in immediately satisfying this demand. It is estimated, however, that by the close of the year a channel 66 feet wide will be generally obtained from the Railway wharf to the deep water beyond the outer light.

## RIVER ST. MARY.

*Neebish Rapids,*

These Rapids are at the foot of Lake George, 25 miles below Sault St. Mary and 25 miles above Bruce Mines.

The improvement of this navigation was carried on during last season until the 27th of October, 1877, when operations were discontinued owing to the severity of the weather.

At the close of last season serious impediments in the Rapids had been removed so that the waters could be navigated with safety. The most shallow portions were first attacked, and every effort was made to render the navigation as easy as it was possible to do. It may be placed on record that previous to the operations of the Department, scarcely a season passed without more than one vessel receiving injury and navigation being entirely obstructed. The sum paid for salvage was in itself a large amount, and the damage to vessels with the impediments to navigation were of the most serious character. Few captains of vessels approached the spot without a deep sense of responsibility. Since the operations of the Department all these causes for fear have been removed; no accident to shipping of any kind has happened, and this reach of the navigation, about 1,600 feet in length, has become, like any other part of the route, to be safely travelled over when ordinary prudence is used. The present design is to obtain a channel 200 feet wide and 14.5 feet deep. At the close of last season generally there was a channel of 100 feet of this depth.

The work was recommenced this season in June, 1878. The season's operations will be continued on the system laid down in 1876-77, with divers and by submarine blasting, the rock *in situ* being removed by nitro-glycerine. The works are in full operation, the organization being perfected according to the experience of past seasons.

It is anticipated that by the close of the present year a channel 160 feet in width and of the required depth will be obtained. Another season is called for to carry out the work as it has been designed. In view however of the ultimate depth of the Lake Superior and Chicago navigation, the depth of this navigation must be held eventually to be 19 feet. At present a limit is imposed by the shallow spots of the River St. Mary and Garden River and Lake George. There is however every indication that the United States Government intend carrying out the improvement by which these obstructions will soon cease to exist. The new lock at Sault St. Mary has 16 feet on the sills and the *raison tre* of this depth can only be found in the contemplated improvement of the route. The Neebish Rapids, although in Canadian waters, furnish the only accessible channel to Lake Superior. The route to the east of Sugar Island, through Hay Lake, which lies in American waters, calls for a very large expenditure for any improvement to be made. But even were that route taken by American commerce, the Neebish Rapids is the only one available to the Dominion, and without sufficient depth, Canadian vessels will suffer, for they will be unable to be constructed of the same draught as American craft. Possibly for some years the width of 200 feet may suffice, although a width of 300 feet would be preferable for so important a spot. The depth however should certainly not be less than 18 feet, although 19 feet would be preferable. As all the appliances and barracks and plant are in good condition, and the organization which has somewhat been severely tested, is now in full operation, the work can be performed under these circumstances cheaper at this period than it can ever again be undertaken.

#### *Sault St. Mary.*

Complaints having been made to the Department of the presence of boulders, which interfered with steamers drawing 10 feet of water coming to this wharf, the Neebish plant was moved up by the tug "Trudeau" on the 10th of June, and operations were commenced the same day at the wharf and its approaches.

The work was completed on the 17th June, by which time 326 cubic yards of rock was removed, free access to and from the wharf having been obtained.

On the 18th of June the plant was taken back to the Neebish.

#### LAKE SUPERIOR.

#### *Prince Arthur's Landing.*

Prince Arthur's Landing is on the north coast of Thunder Bay, about 19 miles from Thunder Cape, and three miles from the entrance of the River Kaministiquia. The navigated distance from Sault St. Mary is reported as 263 miles. A survey of this harbor was made last October, with the view of obtaining information with regard to its capacity, and to establish its fitness for a harbor in connection with the railway.

The width of the bay and the exposure of the Landing to the easterly and south-easterly storms suggests that protection is necessary in these directions to admit of vessels lying with safety at the wharves at the period of gales from these points.

In other directions the Harbor is well protected. The general prevailing wind is south-easterly, and a protection of cribwork is indispensable for the safety of vessels in gales from these points.

The cost of this cribwork would necessarily depend on the area of water enclosed.

At Prince Arthur's Landing so many facilities exist for the construction of a harbor that its size can be determined by the available expenditure.

Estimates have been made for several schemes and submitted to the Department; but however limited the accommodation to be attained, the work cannot be carried out without some cost.

*River Kaministiquia..*

Dredging was commenced on June 4th, and was continued with an interruption of three weeks during August until November 3rd, 1877. A channel 45 feet wide was carried through the shoal at the entrance of the river, and a width of 22 feet through the two shallow reaches between the river's mouth and the saw mill. The dredging has been taken to a depth of 13 feet, lowest water line. Work was resumed on May 14th, 1878, and continued until the close of the fiscal year, and now in progress.

In October, 1877, the steamers of the North-West Transportation Company, and other large steam craft navigating Lake Superior, entered the river and ascended as far as the Pacific Railway Terminus.

It is proposed this season to obtain a width of 66 feet across the bar, a length of 3,500 feet, and to increase the width of the reaches in the river lately dredged to 45 feet; likewise to remove the obstruction opposite McKellar's Creek. The latter is of insignificant extent but in the centre of the stream.

The design is to carry the increased depth to 13 feet lowest range of water.

*Government Dredge, St. Lawrence and Lakes.*

At the commencement of the last fiscal year the dredge was at Kincardine where it continued working till the 3rd October.

On the 13th of October it was moved by the steamer "Ontario" to Goderich for the purpose of removing some reported obstructions at the Dufferin Salt Works dock. The weather was stormy and but little work could be performed at that locality.

Moreover, there was no accommodation for the dredge to lie at the dock, and it had to be placed for safety in Goderich Harbour nightly, that harbour being two miles to the north of the pier.

It was accordingly deemed advisable to discontinue the work, which was carried on with unsatisfactory results until 3rd November.

On the 8th of that month the dredge and plant was towed by the Beatty steamer "Quebec" to Bayfield where it continued working until 29th November, when the dredge was placed in winter quarters.

Owing to the storm having filled the channel of the Kincardine harbour by a deposit of material, it is inferred from the more shallow portions of the harbour, the boats of the Beatty Lake Superior Line were unable to enter, and the dredge was ordered up to relieve the channel. It was taken in tow by the tug "Kate Moffatt" on 26th April and worked until 25th May, by which period the debris was removed and boats could enter.

It was removed to Bayfield on the 27th of May by the "Kate Moffatt," and worked until the close of the fiscal year.

It will remain at Bayfield until the month of August, when it will be transferred to Kincardine to complete the work at that place.

At the commencement of the season the dredge itself was strengthened by diagonal bars and braces. One of the scows was caulked. Some repairs have been given to the tug, but the hull is old, and the boiler old and thin, and can only be used with great care. At the close of the year the hull will require to be almost rebuilt, and a new boiler will be indispensable.

The remaining plant is in good condition.

I have the honor to be, Sir,  
Your obedient servant,

WILLIAM KINGSFORD,  
*Engineer in Charge.*

F. BRAUN, Esq., Secretary,  
Public Works Department,  
Ottawa.

## APPENDIX No. 14.

MARITIME PROVINCES, ST. PETER'S CANAL, HARBORS, PIERS, RIVERS, &c :

SAINT JOHN, NEW BRUNSWICK,  
October 24th, 1878.

SIR,—I have the honor to report on the works under my charge in the Maritime Provinces, for the fiscal year ended 30th June, 1878. These consist of:—

Works under Contract in New Brunswick.

“ “ “ “ Nova Scotia.

“ “ “ “ Prince Edward Island.

“ “ direct charge in New Brunswick.

“ “ “ “ Nova Scotia.

Dredging.

Surveys and Examinations.

### WORKS UNDER CONTRACT IN NEW BRUNSWICK.

#### *Clifton.*

Clifton is situated on the southern shore of the Bay des Chaleurs, about 19 miles to the eastward of the entrance to Bathurst Harbor.

A breakwater at this place was built a few years ago, and the proprietors have transferred their title and interest in it to the Crown.

The works under Contract, consist in lengthening this structure and the construction of a return, or L, at the end, to enclose and protect a small area wherein vessels can obtain shelter. At the close of the year two-thirds of the work had been accomplished.

#### *Shippagan.*

Owing to the failure of the contractor, the works at this place were abandoned at the close of 1876. During October, 1877, they were relet, but work was not resumed until April 1878, and at the close of the year the dam across the East Gully had been completed, and a portion of the breakwater raised to the full height.

#### *Saint. John Breakwater (at Negro Point.)*

This work was completed and accepted in September, 1877. During the month of November following it was subjected to the force of a very heavy gale, and at times was completely submerged by the waves. An examination after the gale shewed that the structure had not received any damage, save the washing away of a few pieces of covering timbers, but that the stone forming the slopes had settled as was anticipated, the stones having, by the action of the sea, bedded themselves into place. Further, severe gales during the winter did not affect the structure, and its usefulness was proved in breaking up the seas during south-west gales, and in keeping them out of the harbor.

#### *Oromocto.*

The obstructions in the St. John, known as the “Oromocto Shoals,” are situated about ten miles below Fredericton. They have always proved to be the most



serious to navigation between St. John and Fredericton during low stages of water in the river. Large sums of money have been expended by the Provincial Government in opening a channel, but without success; and the Department has had a dredge operating during several seasons, giving but partial relief.

At this point the river widens, and is separated into three channels by Oromocto and Thatch Islands, the widest being to the eastward of Oromocto Island. The navigable channel is between Oromocto and Thatch Islands; that west of Thatch Island is but small.

It has been submitted that to close the channels to the east of Oromocto and west of Thatch Islands by dams which would only act when the water in the river has fallen nearly to ordinary summer level (and permitting the freshet water to flow freely over them), the channel would be restricted and the whole volume of water forced to pass between Oromocto and Thatch Islands with a slightly accelerated velocity, which would carry the deposit held in suspension during floods past the shoals, and also in some degree scour out and deepen the channel.

The work under contract consists in the construction of a shear dam 1,600 feet in length, extending from the western shore towards the head of Thatch Island, and, at the end of the year a length of 500 feet had been constructed. The portion built stood successfully the effects of the run of ice and flow of water over it during the spring freshet.

#### *Military Storehouse (at St. John.)*

This building passed through the great fire of the 20th June, 1877. Being built of stone the walls were found to be serviceable, and a contract was entered into for repairing and restoring the building, the work being completed during the month of March.

### WORKS UNDER CONTRACT IN NOVA SCOTIA.

#### *McNair's Cove.*

McNair's, properly Ballentines Cove, Antigonish County, is situated on the west side of St. George's Bay, about five miles southward from Cape George.

The amount appropriated was expended in the construction of a new block at the outer end of the breakwater, constructed between 1872-1875, and in levelling up and protecting the portion of the old work that had settled; the whole being completed during the month of October.

#### *White Point.*

White Point is situated on the Atlantic coast, about six miles to the south-west from Liverpool, Queen's County. At this place a breakwater had been constructed by the inhabitants of the locality assisted by grants from the Local Government.

The works contracted for consisted of lengthening the breakwater, and in the removal of a number of large granite boulders from the area sheltered; the whole being completed during October.

#### *St. Peter's Canal.*

The works of deepening and widening the canal were prosecuted until August, 1877, when they were suspended. In October the contractor was permitted to assign his contract to Mr. James T. Kennedy, who assumed the work without any increase in the contract prices, and up to the close of the year had proceeded therewith in a most satisfactory manner. Arrangements have been made for deepening the canal, to give 18 feet of water on the mitre-sills.

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WORKS UNDER CONTRACT IN PRINCE EDWARD ISLAND.

*Malpeque.*

Malpeque Bay is situated on the northern shore of Prince Edward Island, 90 miles from East Point, and 40 miles from West Cape.

The amount appropriated has been expended in the construction of a breakwater, 600 feet in length from the western end of the "Royalty Sands," on the eastern side of, and at entrance to the Bay, for the purpose of protecting vessels seeking shelter during northerly storms in the Gulf. Up to the end of the year seven-eighths of the work had been completed.

*St. Peter's Bay.*

St. Peter's Bay lies on the northern side of the Island, about 43 miles westward from East Point. The entrance is about 450 feet in width at low water between sand banks, and obstructed by a "bar." Between 1847 and 1873 the Local Government expended the sum of \$7,290.00 for the improvement of the entrance, but with partial success only, owing to the want of a breakwater on the western side. The amount appropriated has been expended in the construction of such a breakwater, and at the end of the fiscal year three-quarters of the work had been completed, and it was noted that the water over the bar had increased in depth.

## WORKS UNDER DIRECT CHARGE IN NEW BRUNSWICK.

*Campo Bello.*

The amount available has been expended in completing the breakwater at Wilson's Beach, constructed during 1873-'74, and in the construction of a shore connection, shutting out the sea from the northward

*Grand Anse.*

This locality is described in my Report for 1875-'76. The amount appropriated has been expended in the completion of the unfinished crib-work left from the previous year, and in securing the portion of the work in place.

## WORKS UNDER DIRECT CHARGE IN NOVA SCOTIA.

*Avonport.*

Avonport is situated at the mouth and on the western side of the Avon River, which empties into the Basin of Minas. The work at this place was commenced in 1856, and extended, during the years from 1868 to 1872, at the expense of the inhabitants aided by grants from the Local Treasury.

An amount of \$500 was expended, with an equal amount contributed by the inhabitants, in repairing and strengthening the works.

*Belliveau's Cove.*

This cove is situated on the east side of St. Mary's Bay, Digby County, and about four miles south from Weymouth. Here the eastern breakwater was commenced in 1825, and the western in 1853, (both enclosing a small harbour), at the joint expense of the inhabitants and the Local Government, the sum expended amounting to \$9,000.

The amount appropriated has been expended in thoroughly repairing both breakwaters and the construction of an additional length, and an L to that on the eastern side.

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*Canning.*

The breakwater at Canning, known as "Pickett's Pier," is situated about two miles below the village of Canning, near the mouth of the Habitant River, which empties into the Basin of Minas, and was commenced in 1845 and added to during 1859-60 by the residents of the locality, assisted by the Provincial Government.

The amount granted was expended in raising and placing the works in a state of repair.

*Cow Bay.*

During the winter and spring of 1876-77, Cow Bay was visited by several severe storms, notably those of 8th and 10th of May, when the breakwater was severely damaged. The amount appropriated has been expended in making good and repairing the work. Owing to its exposed position this breakwater will always experience more or less damage during severe easterly gales.

*Jordan Bay.*

Jordan Bay, Shelburne County, forms the mouth of Jordan River. The amount granted was expended in depositing a quantity of stone on the seaward side and around the outer end of the breakwater, built during 1875-76, to prevent a scouring away of the bottom by the action of the tidal currents.

*Meteghan Cove.*

Meteghan Cove is situated on the eastern shore and at the mouth of St. Mary's Bay, about 25 miles to the northward of Yarmouth. The amount granted was expended in the construction of an additional length of 100 feet to the breakwater commenced during 1874-75, and of a portion of an L at the outer end.

*Morden.*

Morden is situated on the southern shore of the Bay of Fundy, about 50 miles eastward from Digby Gut.

The work at this place was built many years ago at the joint expense of the inhabitants and the Provincial Government, and the amount authorised has been expended in widening the same, and in the construction of an additional length of 20 feet, for the purpose of securing the outer end which had become much decayed.

*Parrsboro'.*

Parrsboro', Cumberland County, is situated on the northern shore of the Basin of Minas. The pier was built during 1864-65, by the Provincial Government. The amount authorised was expended in recovering and repairing damages received from floating ice during the previous winter.

*Port Hood.*

Port Hood is situated on the western coast of Cape Breton, about 23 miles north of the northern entrance of the Gut of Canso, 43 miles south-east from East Point, Prince Edward Island, and 23 miles north-east from Cape George, Antigonish County, Nova Scotia.

The pier at this place was constructed about 1865-66, at the expense of the Provincial Government, and during 1872-73 was almost rebuilt by the Department. During the year a number of fenders were replaced, and the covering raised and repaired.

*Victoria Pier.*

Victoria Pier is situated on the southern shore of the Bay of Fundy, about five miles to the eastward of Morden, King's County. It was commenced in 1864 and finished in 1867, having been built by the inhabitants, assisted by the Provincial Government. The amount granted was expended in repairing and raising the work a height of four feet.

## DREDGING.

*The "St. Lawrence."*

At the commencement of the year this dredge was engaged at Yarmouth, Nova Scotia, continuing there until the 7th of July, removing up to that date 3,080 cubic yards of blue clay, stone and *debris* from the channel opposite the town, making a total, during her stay, of 26,250 cubic yards.

On arrival at Halifax, this dredge was placed on the marine slip for painting, &c., and on the 1st of August commenced work off Her Majesty's Naval Yard, working until the 14th, when it was ascertained that the obstructions to be removed were solid ledge. On this date this work was brought to a close, 612 cubic yards of mud deposit having been removed; and the dredge left for Sydney, Cape Breton, commencing the removal of a portion of a shoal in the harbor, off the leading pier of the Cape Breton Coal Company, and continuing at work until the 2nd of November, having removed 30,100 cubic yards of sand, gravel and mud.

Having been ordered to Saint John to resume work at the Deepwater Terminus of the Intercolonial Railway, she left on the 2nd November, and on her passage, in passing through Barrington, she struck on a ledge of rock doing considerable damage to her hull. Temporary repairs having been effected she arrived in Saint John on the 10th of December, when the repairs were put in hand and completed by the 26th of March, when dredging was commenced and continued until the end of the fiscal year, and a total of 21,830 cubic yards of mud and clay were removed.

*The "Canada."*

At the commencement of the fiscal year this dredge was in the marine slip at Pictou, Nova Scotia, undergoing necessary repairs to the hopper doors, which being completed she proceeded to Bathurst, New Brunswick, and continued at work until the 27th October, removing 17,325 cubic yards of fine sand from the "Outer Bar," and 1,215 cubic yards from the "Seal Bar" inside of the harbor.

At the last mentioned date she was ordered to Guysborough, Nova Scotia, where she arrived and commenced working on the 19th of November, continuing until the 17th of January, 1878, removing 5,400 cubic yards of gravel and stone from "Stony Patch Point" at the entrance to the harbor. Repairs being required she proceeded to Halifax, and after their completion sailed for Lockport, commencing work on the 20th of March, and up to the 17th of May had removed 11,025 cubic yards of sand and mud from the channel in front of the wharves. At this date she was ordered to Richibucto, New Brunswick, where, after a delay at Pictou for painting, refitting, and repairs, she arrived on the 14th of June, and up to the 30th had removed 2,610 cubic yards of sand from the "Bar" at the entrance to Richibucto Harbor.

*The "New Dominion."*

At the close of the previous fiscal year it was found necessary to lay this dredge up to repair and replace portions of the crane machinery and woodwork in connection therewith, which had fairly worn out. On the 27th August work was resumed at the Deep-water Terminus of the Intercolonial Railway at St. John, where she was engaged until the 7th day of June, 1878, having removed 30,380 cubic yards of sand, mud and gravel, and the remains of three old wrecked vessels.

At the last mentioned date she was ordered to the Washademoak, in Queen's County, where work was begun on the 12th, and on the 30th June she had removed 7,710 cubic yards of mud.

### *The "Cape Breton."*

This dredge was working on the East River of Pictou, Nova Scotia, at the commencement of the fiscal year, and continued there until the 4th day of August removing 9,665 cubic yards of mud and gravel. She then proceeded to Harbour au Bouché, Antigonish County, Nova Scotia, remaining there until the 29th August, completing a cut through the "Bar," and removing 5,465 cubic yards of sand, gravel and stones.

On the 30th of August she was removed to the upper reach of Antigonish Harbour, working until the 29th of November, at which date work closed for the winter, having removed 17,285 cubic yards of mud and sand. On the 10th of April, 1878, work was resumed and up to the 7th of May, when it was brought to a close, a further amount of 4,740 yards was removed, making a total of 22,025 cubic yards. Having been removed to Tracadie Harbour, Antigonish County, Nova Scotia, a partial cut was made through the "Bar," removing 2,580 cubic yards of gravel, when on the 29th of May she was taken to River John, Pictou County, at which place she was working, straightening the navigable channel, at the close of the fiscal year having removed 7,595 cubic yards of mud and sand.

### *The "Prince Edward."*

At the beginning of the fiscal year this dredge was engaged in the improvement of the channel of the Montague River, Prince Edward Island, and was there employed until the 29th of September, removing 40,440 cubic yards of soft mud, sand and vegetable matter. At this date she was removed to Charlottetown, and employed up to the 13th of December in the removal of 18,360 cubic yards of mud from the slips in connection with the wharf of the Prince Edward Island Railway. The harbour closing, operations were suspended until the 15th of April, 1878, when this dredge was placed at the "Pownal Wharf," continuing until the 9th of May, working for and on the account of the corporation of the City of Charlottetown, removing 8,520 cubic yards of soft mud, stones and debris.

On the 9th of May work was commenced at Rocky Point Ferry, Charlottetown Harbour, for and on account of the Local Government of Prince Edward Island, and continued until the 11th of June, removing 12,840 cubic yards of soft mud. During the 11th, 12th and 13th of June she was employed in cleaning out the Ferry slip at Charlottetown, removing 300 cubic yards of mud and stones. On the 13th of June she was ordered to Grand River, King's County, and was engaged in operating on the "Bar" up to the close of the year, having removed 2,400 cubic yards of fine sand.

### *The "George McKenzie."*

This dredge was hired from Messrs Ross & McKay on the 23rd of April, 1878, and was employed until the 31st of May at Ketch Harbour, Halifax County, Nova Scotia, and removed 2,938 cubic yards of sand and gravel from the inner bar across the harbour.

On the 1st of June she was ordered to Mahone Bay, Lunenburg County, to improve the channel of the river in front of the town, and was so engaged at the end of the fiscal year, having removed, up to that date, 6,321 cubic yards of soft mud.

## SURVEYS AND EXAMINATIONS.

During the past year surveys and examinations were made at the undermentioned localities; plans, reports and estimates of the works have been forwarded.

Annapolis River.....	Annapolis Co., N. S.
Anderson's Creek.....	Guysboro' Co., N. S.
Amherst Harbour.....	Magdalen Islands, Q.
Forbes Landing.....	Colchester Co., N. S.
Kouchibouguac.....	Kent Co., N. B.
Pudding Pan.....	Queen's Co., N. S.
Point du Chêne.....	Westmoreland Co., N. B.
Ragged Pond.....	Guysboro' Co., N. S.
Rocher Bay.....	Albert Co., N. B.
Split Rock.....	St. John Co., N. B.
Three Fathom Harbour.....	Halifax Co., N. S.

I have the honor to be, Sir,

Your obedient servant,

HENRY F. PERLEY,

*Engineer-in-Charge.*

F. BRAUN, Esq., Secretary,  
Department of Public Works,  
Ottawa.

## APPENDIX No. 15.

### REPORT OF THE CHIEF ARCHITECT.

DEPARTMENT OF PUBLIC WORKS,  
OTTAWA, 26th December, 1878.

SIR,—I have the honor to transmit herewith my report upon the new works and the repairs made to the Public Buildings under the control of the Department, for the fiscal year ending 30th June, 1878.

### PROVINCE OF ONTARIO.

#### OTTAWA.

##### PARLIAMENT GROUNDS.

Further grading, sodding, &c. has been done in addition to that mentioned in my last report, more particularly in the vicinity of the extension of Western Block, Departmental Building.

Proposed arrangements will entail the construction of a retaining wall on the brow of the cliff adjacent to the north-western angle of the Western Block Extension, and the completion of roadways and foot-paths of Grounds.

Plans for a propagating house, for bedding plants, &c., required to decorate Grounds, have been prepared.

Designs for lamps to be fixed in the Grounds on Wellington Street fence wall and at entrances to the Public Buildings were made, tenders called for and the contract awarded to E. Chanteloup of Montreal. Work is now being proceeded with.

It is expected that the Grounds will be, so far as present instructions extend, completed by the fall of this year.

Drawings and specifications were prepared by this Department, and works carried on under its immediate superintendence.

##### LOVER'S WALK.

This has been repaired and fenced where required.

##### PARLIAMENT BUILDING.

##### *House of Commons.*

The walls, ceilings of entrance hall and of corridors and adjoining offices, have been cleaned and walls colored in distemper.

*Main Tower.*—Suitable staircases leading to the deck roof have been fitted up; one stage of the tower is being prepared for the reception of a clock. This clock has been received and will shortly be placed in position. It was manufactured by Messrs. M. F. Dent & Co. of London, England.

An iron staircase is in course of construction, to connect the first floor with the attic, giving convenient access to the roof as well as direct access to the tower. Contractors for stairs, Messrs. Paterson & Law.

Works incidental to the above and connected therewith done by Department.

*Western Block.*

In January last the extension of this portion of the buildings was sufficiently advanced to admit of its being occupied.

The ground floor and a portion of the basement was located for the use of the Post Office Department, and the two upper floors for the Department of Public Works.

On the ground floor the portion of building vacated by the Post Office Department is now occupied by the Department of Customs, and a portion of same by Department of Militia and Defence.

On the first floor the removal of a portion of the Department of Public Works to the extension, caused a rearrangement of rooms; the Department of Marine and Fisheries occupying those vacated by the Department of Public Works, and vacating others which were in turn taken up by the Department of Agriculture.

It was considered advisable that a favorable opportunity occurring whilst these different allocations of rooms were being carried out, that the rooms as vacated should be thoroughly cleaned and retinted before the reoccupation by other Departments. This arrangement was carried out, and has, I am given to understand, been found to give satisfaction.

Works carried on under the immediate superintendence of officers of this Department.

**RIDEAU HALL.**

Since my last report a gasometer house containing a gasometer with capacity of 25,000 cubic feet has been erected in the grounds. The tank for the reception of the gasometer had to be excavated in rock and lined with a hollow brick wall, laid in cement, having the cavity filled in with asphaltum and the floor of tank covered with same material.

The foundation walls of the gasometer house are of stone and the superstructure brick, with a cavity, tinted externally to correspond with the adjacent buildings.

The roof is framed with radiating rafters, the feet of which are kept in position by an angle iron ring, built into the brick work, the upper ends being held in place by a wooden ring, constructed in sections and supporting a lantern, the whole fastened together with iron bolts.

The lighting, heating and ventilation are good and sufficient.

Adjoining the gasometer house is a small building of similar construction, containing an exhaust gas engine and boiler, for filling the gasometer when the city pressure is insufficient.

Owing to the lateness of the season at which work was authorized and the consequent rapidity with which the work had to be executed, it was decided to carry on the works by days' labor, under the immediate superintendence of the officers of this Department.

Tenders were asked for the gasometer and iron work in connection with it, and the contract awarded to Mr. James Perry, of the City of Ottawa, who carried out the work under Departmental supervision.

Plans and specifications connected with the above were prepared by this Department.

The usual and necessary repairs have been executed at the Government House and grounds.

**KINGSTON.**

Since date of my last report the new Educational block has been fitted up with a new steam heating apparatus. Work executed by Messrs. Mathewson, Young & Company, of Montreal, from drawings and specifications prepared by this Department and under its immediate supervision.



The contract for the erection of the new Educational block is also completed. Roads through the grounds have been formed and open spaces planted with trees. The usual and necessary repairs and alterations to old buildings and fortifications have been carried out,

Architect in charge, Mr. R. Gage.

### GUELPH.

#### POST OFFICE, CUSTOM HOUSE AND INLAND REVENUE OFFICE.

This building was completed early this year and is now fitted up, furnished and occupied.

Plans and specifications were prepared by this Department and the works carried on under the supervision of Mr. A. Dalglish, Clerk of Works.

### BRANTFORD.

I have been instructed to prepare drawings and specifications for a Post Office, Customs and Inland Revenue building.

### WINDSOR.

As an appropriation of \$30,000 was authorized at the last session of Parliament for the erection of a building to accommodate the Post Office, Customs, and Inland Revenue Departments, I beg to state that I have received instructions to prepare plans and specifications so soon as site of proposed building is decided upon and land purchased.

## PROVINCE OF QUEBEC.

### MONTREAL.

#### EXAMINING WAREHOUSE.

The contract works in connection with masonry and carpenters' work on this building have been completed and the fittings and furniture are now being constructed.

During the fiscal year tenders were asked for engines, boilers, and hoisting machinery, heating and plumbing, and roadway in rear of building, foot paths, fences, &c., contracts for which were awarded respectively to W. P. Bartley & Co., R. Mitchell & Co., and James Howley, all of Montreal.

This building is now partly occupied as a store for unclaimed goods by the Department of Customs.

Plans and specifications for the above works (except engine hoisting machinery which the contractor furnished) were prepared by this Department.

#### ST. VINCENT DE PAUL PENITENTIARY.

Extensive additions to the Penitentiary proper are now in progress. The external walls of an additional wing have been carried up to an average height of say ten feet; it is expected that this portion of the work will be roofed in this fall so that work can be carried on for cell portion of work (inside) during the winter.

For the works executed and to be executed, convict labour has been utilized under the superintendence of the Prison instructors and the direction of the supervising architect, Mr. John Bowes.

At the commencement of the works a difficulty was experienced in getting work properly done as the convicts had not the necessary experience, but with practice they are now doing work of requisite quality.

The stone for these works is being quarried in the Penitentiary quarries, which have been further opened out, and stone of a fair quality is now being obtained.

From this quarry a tramway is being constructed to facilitate the conveyance of stone to the prison.

Plans and specifications prepared by this Department.

## ST. JOHNS.

### CUSTOM HOUSE, POST OFFICE AND CANAL OFFICE.

The site for this building is on the eastern side of Richelieu Street extending from same to the Chambly Canal grounds, with a frontage of 52 ft. 6 in. English measure on Richelieu Street.

The foundation will be of stone carrying two full stories of brickwork surmounted by a mansard roof. The Post Office will occupy the front room of the ground floor which is 24 ft. x 35 ft. 4 in. with a front entrance.

To the rear of the Post Office are two offices and the staircase hall.

The arrangement of rooms on the first floor is similar to that below it.

The attic is not to be finished at present.

Tenders for the erection of the building were called for and the contract awarded to Mr. Alexander Paquette.

Drawings and specifications prepared by this Department.

Architect in charge, Mr. A. C. Hutchison, Montreal.

## QUEBEC.

### FORTIFICATIONS, QUEREC.

Plans are being prepared for two new gates to be named respectively Kent and St. Louis, forming part of the proposed "Dufferin Improvements."

One of these gates is to be erected on the site of old St. Louis Gate, the other in that part of the fortification wall which has been broken through by authority of the City of Quebec in order to connect Nouvelle and Ursulines Streets.

The style of architecture of the gateways is a variety of castellated adapted to harmonize as far as possible with the existing fortifications. Each gate has a central roadway passage under a segmental arch for general traffic, and a semi-circular archway on either side for foot passengers. These roadways and footways are arched in stone, the haunches being filled with concrete covered with a layer of asphaltum after which they are brought to a level with broken stone and covered with a platform of wood block pavement, forming with the fortification wall a continuous promenade. On front and rear walls are embattled stone parapets corbelled outwards from face of walls, and on either end stone steps leading to the city streets. There is a stone tower, with pyramidal dormered wooden roof, to each gate, that on Kent Gate extending across the full width, while St. Louis Gate tower projects nearly two-thirds outwards from the general face of wall. Opening on the platforms are corbelled stone turrets of horseshoe plan, one on Kent and two on St. Louis, of the latter being covered with a slate and lead roof. Boldly corbelled cut stone balconies are placed on Kent Gate, one on the tower in front and the other on the platform in rear.

It is expected that tenders will be called for shortly and the contract awarded sufficiently early to admit of the foundations being put in this autumn.

Plans prepared by, and the works carried on under the immediate superintendence of this Department.

Very extensive repairs have been done to the fortification walls. These repairs were executed by days' work, being of such a nature that contracts could not be entered into.

Local Superintendent of Works for fortifications, Mr. J. B. Bertrand.

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## PROVINCE OF NEW BRUNSWICK.

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### DORCHESTER.

#### GENERAL PENITENTIARY FOR THE MARITIME PROVINCES.

Work on this building since my last report has been satisfactory.

It is expected that the whole building will be roofed in this fall, and the plasterers' and joiners' work proceeded with during the winter, so that the whole works embraced in the present contract may be completed next spring.

Plans and specifications prepared by this Department. Architect in charge, Mr. Mathew Stead, St. John, N.B. Contractor, Mr. Alexander McKenzie.

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## NORTH-WEST TERRITORIES.

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### BATTLEFORD.

#### OFFICIAL RESIDENCES.

At the time my report for 1877 was prepared, it was thought probable that the official residences would be finished by the middle of the month of October in that year. Owing however to a sudden and unexpected rising of the Saskatchewan River, a large quantity of the lumber prepared for these buildings was carried down the stream.

This and other losses had the effect of delaying the works. The buildings are now reported complete, they being now occupied by the Lieutenant-Governor, Stipendiary Magistrate, Registrar and resident Clerk of the Council.

Work was carried on by days' labor, owing to there being no contractors in that section of the country capable of performing the work.

Superintendent, Mr. Hugh Sutherland.

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## BRITISH COLUMBIA.

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### WESTMINSTER PENITENTIARY.

Since I last reported, the fittings and furniture have been supplied and fixed, and the building has been handed over to the Department of Justice for occupation and reception of prisoners.

Necessary repairs have been executed in connection with the Public Buildings at Victoria, B. C.

#### GENERAL.

A large number of minor necessary repairs have been executed to various buildings throughout the Dominion, none of which are of sufficient importance to report upon in detail, but calling for a large amount of personal attention and special supervision.

I have the honor to be, Sir,

Your obedient servant,

THOS. S. SCOTT,

*Chief Architect.*

F. BRAUN, Esq., Secretary,  
Department of Public Works,  
Ottawa.

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## APPENDIX No. 16.

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### GENERAL STATEMENT SHOWING

- 1st. Water Power and other Public Property leased on Canals, &c., during the year ended 30th June, 1878.
  - 2nd. Property purchased or sold by the Department, during the fiscal year.
  - 3rd. Property declared to be no longer under the control of the Department.
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**GENERAL STATE**

*1st — Water Power and other Public Property leased on*

Date.	Term of Lease.	Lessees.	Property Leased.	For what purpose used.
July 23, 1877	Pleasure of Government.	The Temporal Committee of St. Andrew's Church.	Part of Reserve in front of lot H. Con. C., Nepean, or glebe lot, Rideau Canal.	Farming.....
Nov. 21, "	do	Thomas Kingston .....	Part of Reserve in front of lot A. Stewarton, or F. Con. C., Nepean, Rideau Canal.	Gardening.....
Sept. 24, "	do	John Burgess .....	Part of Reserve in front of lot 40, 1st Con., Nepean, Rideau Canal.	Farming.....
Nov. 15, "	do	Frs. Abbott.....	Part of Reserve in front of lot 40, 1st Con., Nepean, Rideau Canal.	do .....
Dec. 1, "	do	Andrew Hickey.....	Part of Reserve on lot G., Con. C., Nepean, Rideau Canal.	Gardening.....
Jan. 18, 1878	do	Laurent Duhamel .....	Part of Reserve fronting sub-lot 28 of lot K. O. B., Nepean, Rideau Canal.	do .....
May 22, "	do	W. J. Webster.....	Part of Reserve on lot No. 1, 3rd Con. N., Crosby, Newboro', Rideau Canal.	Storehouse .....
June 18, "	do	Geo. Shepherd.....	Part of Reserve on lot No. 4, in 1st Con., Oxford, Rideau Canal.	Farming.....
" 13, "	do	G. W. McCullough...	Part of Reserve on S. W. side of entrance to Deepcut, in basin, Ottawa, Rideau Canal.	Storing coal.....
Aug. 22, 1877	3 or 5 years....	Harbor Commissioners, Montreal.	Lease to Government of 3 rooms in their building on lot No. 1, Common St., Montreal.	Lachine Canal Offices.
Dec. 1, 1876	5 months.....	A. E. McCarren... ..	Lot No. 1, Fort William, on Can. Pacific Railway.	.....
" "	" .....	Chs. Baker .....	Lot No. 2, Fort William, Hector St., Pacific Railway.	.....
" "	" .....	John McLaurin.....	Lot No. 17, Hector St., 17 Water St., Fort William, Pacific Railway.	.....
" "	" .....	Thos. Griffin .....	Lot No. 2, Water St., 17 Water St., Fort William, Pacific Railway.	.....
" "	" .....	Pierre Desjardins....	Lot No. 18, Hector St., 18 Water St., Fort William, Pacific Railway.	.....
" "	" .....	Chs. Emmerson.....	Lot No. 1, Water St., Fort William, Pacific Railway.	.....
" "	" .....	John Gillis .....	Lot No. 10, block S, in lot 6, Nepean, Pacific Railway	.....
" "	" .....	Chs. Hudon.....	Lot No. 19, Hector & 19 Water St., Fort William, Pacific Railway.	.....
April 13, '78	20 years.....	Aug. Cantin.....	Lot at entrance of his dry dock, Montreal, near St. Gabriel Lock, Lachine Canal.	Extension of his Dry Dock.
Sept. 5, 1877	Pleasure of Government.	Wm. Clegg.....	Part of lot W. & 6, 1st Con., Edwardsburg, Gallops Canal.	Farming.....
Nov. 3, "	do	Corporation Township Thorold.	Part of lot 17, near basin below waste weir, near Lock 24, Thorold, Welland Canal.	Engine house.....
Feb. 22, 1878	do	Theodule Gauthier...	Part of lot 20 & 21, 1st Con., Catherinestown, above Beaucharnois Canal.	Farming.....
Aug. 3, 1877	do	R. N. Walsh.....	Wharf lot & shed above Guard Wharf Lock, Beaucharnois Canal.	.....
April 2, 1878	re.....	H. Holbrook.....	Buildings, Wharf, &c., at Camp Reserve, New Westminster, B. C.	.....

## MENT SHOWING:

*Canals, &c., during the Fiscal Year ended 30th June, 1878.*

Amount of water power leased.	Area of property leased.	Date from which Lease is reckoned.	Annual Rental.	Terms of payment.			Remarks.
				Amount of each instalment.	When payable each year.	When first instalment was due.	
W. } E. }	<sup>A R P</sup> 1 0 4 <sup>78</sup> <sub>100</sub>	April 1, 1877	\$10 00	\$10 00	January 1 .....	On delivery of lease.	1st instalment \$7,50. another lot granted them by Minister of Interior.
.....	<sup>R</sup> <sup>Poles</sup> 2 8 <sup>1</sup> <sub>2</sub>	Nov. 1, 1877	2 00	2 00	November 1....	do	
.....	1 acre...	Sept. 1, 1877	3 00	3 00	September 1...	do	
.....	<sup>A</sup> <sup>R</sup> <sup>P</sup> 0 <sup>1</sup> <sub>100</sub> a.	Nov. 1, "	3 00	3 00	November 1....	do	
.....	<sup>A R P</sup> 1 1 14	Dec. 1, "	2 00	2 00	December 1....	Dec. 1, 1877.	
.....		Jan. 1, 1878	1 00	1 00	January 1.....	On delivery of lease.	
.....	666 yds.	May 1, "	1 00	1 00	May 1.....	do	Store built by lessee in 1873.
.....	<sup>A R P</sup> 4 2 4	June 1, "	4 50	4 50	June 1.....	do	Above bridge at Burritt's Rapids.
.....	100 x 76 feet.	" "	60 00	60 00	" .....	do	
.....		Nov. 1, 1877	1250 00	312 50	Feb. 1, May 1, } Aug. 1, Nov. 1 }	Feb. 1, 1878.	
.....		Dec. 1, 1876	.....	0 50	1st of each month.	Dec. 1, 1876.	
.....		"	.....	0 50	" ..	"	
.....		"	.....	0 50	" ..	"	
.....		"	.....	0 50	" ..	"	
.....		"	.....	0 50	" ..	"	
.....		"	.....	0 50	" ..	"	
.....		"	.....	0 50	" ..	"	
.....		"	.....	0 50	" ..	"	
.....		April 1, 1878	1 00	1 00	January 1 .....	Jan. 1, 1879.	
.....		Aug 1, 1877	12 00	12 00	August 1.....	Aug. 1, 1877	
.....		Oct. 1, "	5 00	5 00	October 1.....	Oct. 1, "	
.....		Date of lease	20 00	20 00	May 1.....	Date of lease	By letter No. 43284.
.....	100 feet front.	Aug. 1, 1877	23 00	23 00	Aug. 1.....	On delivery of lease.	
.....		Dec. 25, "	156 00	39 00	Quarterly.....	March 25, '78	

## 2nd.—Property purchased or sold by the Department during the Fiscal Year ended 30th June, 1878.

Date.	Vendors.	Purchasers.	Property purchased or sold.	For what purpose used.	Area of Land.	Price of Sale.	Remarks.
Feb. 7, 1877.	Dominion Government.....	Local Government, Ontario.	Provisional agreement for sale of Rockwood Asylum, Kingston.....			\$ cts.	
Aug. 29, 1877.	Jas. Murray.....	Her Majesty.....	Bond by him in \$1,600 to pay \$800 to Govt. for damages to lock 21, Welland Canal, by his schooner "Sea Gull".....	Criminal Lunatics.....		96,500 00	
" 15, 1877.	Daniel Hayes.....	"	Releases for damages } Lot 2, Grand River, by Dunnville Dam, } township Moulton Welland Canal.	Damages.....		800 00	
Nov. 12, 1877.	Wm. Ash.....	"	"	"		750 00	
Oct. 23, 1877.	Thos. Grainger.....	"	"	"		900 00	
Sept. 26, 1877.	Isaiah Laws.....	"	"	"		20 00	
Nov. 6, 1877.	G. A. Gibson.....	"	"	"		10 00	
Oct. 23, 1877.	Haney, Gash & McIndoe.....	"	"	"		25 00	
Aug. 17, 1877.	Mary and Thos. Braund.....	"	"	"		300 00	
Sept. 26, 1877.	{ S. Cowell & J. T. Gilkinson.....	"	"	"		75 00	
Nov. 28, 1877.	{ Supt. Six Nation Indians.....	"	"	"		60 00	
" 17, 1877.	Henry Rolla.....	"	Deed to Government, part lot 30, Thorold.....	Welland Canal	8 acres	768 00	
" 17, 1877.	Ed. Smith et ux.....	"	Deed to Government, part lot 30, Allandale, between Water and Canby Streets	"	0 1/2 acres	1,500 00	
" 17, 1877.	B. Tucker et ux.....	"	Deed to Government, part lot 28, Allandale, between Water and Canby Streets	"	0 1/2 "	400 00	

"	29, 1877.	Jas. Stull.....	Deed to Government, part lot 7, in 9th Con., Grantham.....	"	.....	0 1/8	"	.....	150 00
Jan. 14, 1878.	Wm. Upper et ux...	Deed to Government, parcels 16, 17, Allandburg, or 119 Thorold.....	"	.....	.....	0 1/8	"	.....	350 00
"	19, 1878.	John Kelly et ux...	Deed to Government, part lots 31, 49, Thorold.....	"	.....	40	"	.....	5,200 00
"	28, 1878.	John Mathews et ux	Deed to Government, part lot A., Port Colborne, or 27 in 1st Con., Humberstone.	"	.....	0 1/8	"	.....	3,800 00
"	18, 1878.	John Drake. ....	Deed to Government, right to overflow "Earl tract" or lot No. 1, Township Dunn, N. & S. of road from Pt. Maitland to Dunnville.....	"	.....	.....	.....	.....	200 00
"	18, 1878.	Jas. Gordon et ux..	Deed to Government, right to overflow lots 16, 17, Village Haldimand, or 16 in 1st Con. Dunn.....	"	.....	.....	.....	.....	125 00
"	26, 1878.	W. H. Carter et ux.	Deed to Government, lot 27, 1st Con., Humberstone, or lot K, east of Port Colborne Lock.....	"	.....	0 1/8 acres.....	.....	.....	3,500 00
"	31, 1878.	David Cooper et ux	Deed to Government, lot 25, in 5th Con. Crowland, including surrender to Government of a lease to Moses Cook of 1861, on same lot and mill lot at Meriville.....	"	.....	{ 0 25/100 0 100	"	.....	15,000 00
"	25, 1878.	Estate John Brown	Deed to Government, lots 10, 11, 30, Stamford.....	"	.....	8 1/8	"	.....	1,680 00
Feb. 11, 1878.	John Neff et ux.....	Deed to Government, lot 26 in 3rd Con., Humberstone.....	"	.....	.....	17 1/8	"	.....	1,467 10
"	14, 1878.	Geo. Hannah et ux.	Deed to Government, lots 26, 27, in 7th Con., Crowland.....	"	.....	6 1/2	"	.....	2,000 00
Jan. 22, 1878.	M. Brown et al. ....	Deed to Government, lot 30, Thorold.....	"	.....	.....	7 1/8	"	.....	1,120 00
Feb. 11, 1878.	Eliz. Cross et vir....	Deed to Government, lot 27 in 1st Con., Humberstone, or 28 N. of Lock at Port Colborne.....	"	.....	.....	0 1/8	"	.....	3,300 00
"	5, 1878.	John McDonagh.....	Deed to Government, lot 73, Thorold.....	"	.....	16 1/8	"	.....	2,000 00
Jan. 16, 1878.	Mary O'Connor.....	Release, damages to crops, lot in Humberstone.....	"	.....	.....	.....	.....	.....	30 00
Feb. 20, 1878.	Domk. Gibbons.....	Deed to Government, lot 27, 1st Con., Humberstone, or 29 Port Colborne.....	"	.....	.....	0 1/8 acres.....	.....	.....	500 00
Feb. 25, 1878.	Widow Plooma Ramey.....	Deed to Government of lot 27, 1st Con. Humberstone, or 29, Port Colborne.....	"	.....	.....	0.5	"	.....	1,400 00
March 18, 1878.	Thos. Higgins .....	Deed to Government of lot 96 and road allowance, Thorold.....	"	.....	.....	1.20	"	.....	130 00
"	25, 1878.	Jas R. R. Second et ux .....	Deed to Government of lot 7 in 9th Con. Grantham.....	"	.....	2.00	"	.....	330 00
April 29, 1878.	R. J. Blamey et ux & Eliz. A. Niger.	Deed to Government of lot 28 in 2d. Con. Humberstone.....	"	.....	.....	0.55	"	.....	175 00



## 2nd. Property sold or purchased by the Department &amp;c.—Continued.

Date.	Vendors.	Purchasers.	Property purchased or sold.	For what purpose used.	Area of Land.	Price of Sale.	Remarks.
April 27, 1878	S. D. Woodruff <i>et al.</i>	Her Majesty	Deed to Government of road allowance between lots 26, 27 in 7th Con. Crowland	Welland Canal Enlargement	11.00 acres	\$ cis.	
June 28, 1878	I. & T. Conlon <i>et al.</i>	"	Deed to Government part 247, Thorold, or 24, 25, 26, 27, town of Welland.	"	0.80 "	100 00	
April 12, 1878	John Wright <i>et al.</i>	"	Deed to Government part 26 in 2d. Con. Humberstone	"	2.78 "	944 00	
Feb. 27, 1878	Jérémie LeBel	"	Receipt for damages to lot 75 St. Arsène, Section 1	Intercol R'y		222 00	Formerly E. H. Carver.
"	Pierre Dumont	"	Receipt for damages to lot 86 St. Arsène, Section 1	"		50 00	
"	J. C. Dion	"	Receipt for damages to lot 127 St. Arsène, Section 1	"		40 00	
March 2, 1878	Pierre Dubé	"	Receipt for damages to lot 138 Isle Verte, Section 1	"		40 00	
Feb. 27, 1878	Jos. Dubé	"	Receipt for damages to lot 161 Isle Verte, Section 1	"		50 00	
March 2, 1878	X. Thériault	"	Receipt for damages to lot 152 Isle Verte, Section 2	"		18 00	
Feb. 27, 1878	X. Godbout	"	Receipt for damages to lot 17 Isle Verte, Section 2	"		50 00	
"	Alexis Leclerc	"	Receipt for damages to lot 33 Trois Pistoles, Section 2	"		20 00	
"	Hyp. Lebel	"	Receipt for damages to lot 38 Trois Pistoles, Section 2	"		40 00	
"	G. Renouf	"	Receipt for damages to lot 71 Trois Pistoles, Section 2	"		15 00	
"	N. Rioux	"	Receipt for damages to lot 84 Trois Pistoles, Section 2	"		10 00	
March 4, 1878	M. Dubé	"	Receipt for damages to lot 131 Trois Pistoles, Section 2	"		10 00	
Feb. 27, 1878	O. Dastous	"	Receipt for damages to lot 20 St. Fabien, Section 6	"		45 00	
"	F. Ouellet	"	Receipt for damages to lot 48 St. Fabien, Section 6	"		3 00	
"						10 00	

Feb. 28, 1878	Mrs. G. St. Pierre & F. Tremblay .....	"	.....	Receipt for damages to lot 216 N. D. du Sacré Cœur, Section 5. ....	"	.....	150 00
"	26, 1878 E. O. Martin .....	"	.....	Receipt for damages to lot 263 Rimouki, Section 5. ....	"	.....	20 00
"	28, 1878 V. Rebel .....	"	.....	Receipt for damages to lot 3 Rimouki, Section 8. ....	"	.....	10 00
"	28, 1878 J. Hippell .....	"	.....	Receipt for damages to lot 38 St. Anaclet, Section 8. ....	"	.....	49 00
March 1, 1878	Jos. Oaron .....	"	.....	Receipt for damages to lot 95 Ste. Luce, Section 8. ....	"	.....	20 00
"	1, 1878 W. Simard .....	"	.....	Receipt for damages to lot 98 Ste. Luce, Section 8. ....	"	.....	40 00
"	1, 1878 Jean Larrivée .....	"	.....	Receipt for damages to lot 97 and 109 Ste. Luce, Section 8. ....	"	.....	40 00
"	2, 1878 Alex. de Champlain .....	"	.....	Receipt for damages to lot 110 Ste. Luce, Section 8. ....	"	.....	30 00
"	1, 1878 Pierre Desrosiers .....	"	.....	Receipt for damages to lot 121 Ste. Luce, Section 8. ....	"	.....	30 00
"	1, 1878 M. Desrosiers .....	"	.....	Receipt for damages to lot No. 122, Ste. Luce, Section 8. ....	"	.....	30 00
"	1, 1878 L. Desrosiers .....	"	.....	Receipt for damages to lot No. 123, Ste. Luce, Section 8. ....	"	.....	30 00
"	1, 1878 J. St. Laurent .....	"	.....	Receipt for damages to lot No. 138, Ste. Luce, Section 8. ....	"	.....	40 00
"	2, 1878 Alfred Blais .....	"	.....	Receipt for damages to lot No. 9, township Gausapical, Section 19. ....	"	.....	10 00
June 14, 1878	Her Majesty .....	Spring Hill Mining Co. ....	.....	Transferring them, railway branch to their mine, from Junction. ....	"	.....	.....
May 3, 1878	A. St. Denis et ux. ....	Her Majesty .....	.....	Deed to Government part of lot No. 2, in 1st Con. East Hawkesbury, for dam. ....	Carillon Rapids Ottawa Riv.	2-97 acres. ....	297 00
Jan'y 31, 1877	E. Hudon, jr., by official assignee. ....	"	.....	Receipt for damages by leakage, re Hudson's drain. ....	Lachine Canal	.....	1000 00
March 26, 1877	Her Majesty .....	Harbor Com'rs of Montreal .....	.....	Transferring them Isle Ronde, opposite Montreal, P. Q. ....	Harbor. ....	.....	.....
Sept. 6, 1877.	"	Western Counties Railway Co. ....	.....	Transferring them possession of Windsor Branch of N. S. Railway prior to completion of line from Yarmouth to Annapolis. ....	.....	.....	.....
Dec. 17, 1877	D. McGillis et ux. ....	Her Majesty .....	.....	Deed to Government of lot 14, 1st range, Allumette Island, Calbute Dam. ....	Submerged. ....	4 acres. ....	100 00
"	24, 1877. George Drew .....	"	.....	Release for damages and deed to Government lot No. 1 in 7th C, Olden, by Eagle Lake Dam. ....	Rideau Canal. ....	.....	120 00

## 2nd.—Property sold or purchased by the Department, &amp;c.—Continued.

Date.	Vendors.	Purchasers.	Property purchased or sold.	For what purpose used.	Area of land.	Price of Sale.	Remarks
May 22, 1877.	Her Majesty .....	St. Andrews Church of Scotland .....	Crown grant of part of lot H, Con C, Rideau front, Napesau.....	Rideau Canal, Can.	3 ac. 31 per 100.	\$ cts.	
" 25, 1877.	Ann Cameron .....	Her Majesty .....	Deed to Government, part of lot 8 in 4th Con. C, Paipouge .....	" Pacific Railway .....	4-40 acres .....	1278 70	
Aug. 14, 1877.	Hugh Currie.....	" .....	Deed to Government, lot 15 in 5th C, Oliver .....	" .....	13 53 " .....	39 80	
1877.	Chas. Reid .....	" .....	Deed to Government, part of Reserve in 21, 22, Con A and B, Dawson Road Survey .....	" .....	" .....	67 65	
" 14, 1877.	John Aikens.....	" .....	Deed to Government, part of Reserve in 38, 39, Con. A, Dawson Road Survey .....	" .....	5-78 " .....	600 00	
" 22, 1877.	John O. Haskings.	" .....	Deed to Government, part lot 26, S. Frederica St., Fort William .....	" .....	4-41 " .....	235 28	
" 7, 1877.	O. F. Elwes et ux.....	" .....	Deed to Government, part lot 25, S. Frederica St., Fort William .....	" .....	" .....	10 00	
" 22, 1877.	J. McIntyre et ux.....	" .....	Deed to Government, part lot 19, Hector St., East Fort William .....	" .....	0-50 " .....	505 00	
1877.	Jas. Craig .....	" .....	Deed to Government, Store on lot 20 Con. B, Dawson Road Survey .....	" .....	0-50 " .....	300 00	
Aug. 17, 1877.	Christina McVicar.	" .....	Deed to Government, part 1, 8 in 4 Con. Paipouge .....	" .....	" .....	200 00	
" 25, 1877.	Amb. Cyrette et ux .....	" .....	Deed to Government, 1/2 of N. W. 1/4, 26, S. Frederica St., Fort William .....	" .....	4-40 " .....	39 60	
" 18, 1877.	Geo. F. Duggan et ux.....	" .....	Deed to Government, 1/2 of N. W. 1/4, 26, S. Frederica St., Fort William .....	" .....	66 x 83 feet .....	40 00	
March 7, 1878.	P. Nicholson.....	" .....	Assigns to Government, a mortgage for \$1500, he holds on lots of Cyrette and Duggan, Fort William .....	" .....	66 x 82 1/2 " .....	40 00	
Feb. 27, 1878.	Executors of Nelson M. Itt. ....	" .....	Part of lots 8 and 9, at St. John, P. Q. ....	" .....	" .....	40 00	
April 17, 1878.	Rose Brady & E. Lassart.....	" .....	Writ of ejectment to them by Court Q. B. Toronto, from Government Reserve, at Junction.....	Post Office &c. ....	" .....	1600 00	Williamsburg Canals.....

*Brd.—Public Property declared to be no longer under the control of this Department, or transferred, during the Fiscal Year ended 30th June, 1878.*

Date of Order in Council.	Published in the <i>Canada Gazette</i> .		Property.	To whom transferred or abandoned.	Remarks.
	Page.	Year.			
Oct. 26, 1877.	512	1877	The Desjardins Canal, transferred subject to provisions of the Act 39 Vic., cap. 17, 1876.....		
Feb. 19, 1878.	.....	.....	The Government works at the Iroquois Falls of Vermillion River, a tributary of the River St. Maurice.....	Corporation town of Dundas.....	Transferred for ever. Abandoned.

H. A FISSIAULT.

OTTAWA, 24th October, 1878.



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## APPENDIX No. 17.

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DEPARTMENT OF PUBLIC WORKS, CANADA,  
OTTAWA, 22nd Nov., 1878.

SIR,—I beg to transmit herewith a Statement of the Claims referred to and arbitrated upon by the Official Arbitrators, during the fiscal year ending the 30th June, 1878.

I have the honor to be, Sir,  
Your obedient servant,

F. H. ENNIS,

F. BRAUN, Esq., Secretary,  
Department of Public Works,  
Ottawa.

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STATEMENT of Claims referred to and arbitrated upon by the Official Arbitrators during the Fiscal Year ended 30th June, 1878.

Claimant.	Subject of Claim.	Date of reference to Arbitration.	Amount claimed.	Amount awarded.	Date of Award.	Remarks.
J. B. Pouliot .....	Damages, &c., to property, resulting from construction of Intercolonial Railway, Section No. 1.....	June 8, 1876...	\$ cts. 500 00	\$ cts. .....	.....	Claimant failed to appear when called, case being considered as amicably settled and withdrawn.
J. B. A. Chamberland.....	do do .....	do .....	150 00	.....	.....	The nature of this claim having changed since the date of reference, claimant has withdrawn it and preferred a new claim.
Joseph Coulombe, Jun.....	do do .....	do .....	.....	.....	.....	No award made, case having been amicably settled with Roadmaster
Pierre Desjardins.....	do do .....	do .....	130 00	Nil.	Dec. 3, 1877....	This is a case arising from snow fence, and is specially reported on.
Jean Herubé.....	do do .....	do .....	153 33	Nil.	do .....	
François Lebel.....	do do .....	do .....	478 00	Nil.	do .....	
Jérôme Lebel .....	do do .....	do .....	430 66	50 00	do .....	
J. Candide Dion .....	do do .....	do .....	50 00	40 00	do .....	
Wm. Simard .....	do do .....	do .....	133 33	Nil.	do .....	
Ellaire or Alarie Dubé .....	do do .....	do .....	75 00	Nil.	do .....	
Jude Ouellet.....	do do .....	do .....	333 33	.....	.....	
Alexis Leclerc.....	do do .....	do .....	418 66	40 00	do .....	
Ugère or Euger Dion.....	do do .....	do .....	100 00	Nil.	do .....	
Theophile Belanger.....	do do .....	do .....	62 00	Nil.	do .....	
Magloire Dubé .....	do do .....	do .....	281 00	45 00	do .....	
Cyrille Gagnon.....	do do .....	do .....	666 66	Nil.	do .....	
Napoléon Côté.....	do do .....	do .....	130 00	Nil.	do .....	
Ellaire Dubé.....	do do .....	do .....	60 00	Nil.	do .....	
Narcisse Bellefleur.....	do do .....	do .....	80 00	Nil.	do .....	
Widow Theo. Soucy.....	do do .....	do .....	100 00	Nil.	do .....	
Sifrot Dubé.....	do do .....	do .....	100 00	Nil.	do .....	

Vital Rioux .....	do	do	do	do	40 00	NIL	do	Claimant fails to appear when called.
Joseph Michaud .....	do	do	do	do	40 00	NIL	do	
Napoléon Rioux .....	do	do	do	do	50 00	10 00	do	
Jules Larrivé .....	do	do	do	do	80 00	NIL	do	
Hermidas Denis .....	do	do	do	do	80 00	NIL	do	
Celestin Bernier .....	do	do	do	do	Not stated.	Not stated.	do	
Widow P. Garant .....	do	do	do	do	Not stated.	Not stated.	do	
Cyrilac Dastous .....	do	Section No. 5...	do	do	20 00	3 00	do	Case heard, but claimant failed to produce documents promised and arbitrators therefore made no award.
Magloire Dubé .....	do	do	do	do	Not stated.		do	
Fabien Ouellet .....	do	do	do	do	18 00	10 00	do	Claimant fails to appear when called.
Luceon Belanger .....	do	do	do	do	300 00		do	This case was tried in 1876, during claimant's absence, and as his representative was unable to produce title deeds required, the arbitrators rendered an award against him. In 1877 claimant himself appeared before the Board and applied to have the matter reconsidered. The application was granted, and on this second investigation claimant submitted what modified his claim and produced the required title deeds. The arbitrators' second award, as here shown, was in Heppell's favor, to the extent of \$40. Specially reported on.
Radras Dechene .....	do	do	do	do	35 00		do	Ruled out by arbitrators. Special report made.
A. Poirier .....	do	Section No. 17...	do	do	60 00		do	
Joseph St. Laurent .....	do	Section No. 8...	do	do	1,000 00		do	
Pierre Dumont .....	do	Section No. 1...	do	Oct. 4, 1876...	181 33	40 00	do	
Elie Martin .....	do	do	do	do	186 60	10 00	do	
Prudent Cailionet .....	do	do	do	do	100 00	NIL	do	
Hypolite Lapointe .....	do	do	do	do	Not stated.	NIL	do	
Jos. Dubé .....	do	do	do	do	150 00	18 00	do	
Jos. Caron .....	do	do	do	do	50 00		do	This is a case arising from snow fence, and is specially reported on.
Xavier Thériault .....	do	do	do	do	166 66	50 60	do	
John Clark .....	do	do	do	do	Not stated.	NIL	do	
Narcisse Dumas .....	do	Section No. 2...	do	do	Not stated.	NIL	do	
F. X. C. B. dit .....	do	do	do	do	Not stated.	20 00	do	
Abelton Legere .....	do	do	do	do	300 00	NIL	do	



## APPENDIX No. 18.—STATEMENT of Claims referred to and arbitrated upon by the Official Arbitrators, &amp;c.—Continued.

Claimant.	Subject of Claim.	Date of reference to Arbitration.	Amount claimed.	Amount awarded.	Date of Award.	Remarks.
Louis Turcot .....	Damages, &c., to property resulting from construction of Intercolonial Railway, Section No. 2 ....	Oct. 4, 1876...	\$ cts. 60 00	\$ cts. Nil.	.....	
Widow Jonas Rioux.....	do do .....	do .....	80 00	Nil.	.....	
Joseph Parent .....	Section No. 5....	do .....	100 00	Nil.	.....	
André Parent.....	do do .....	do .....	80 00	.....	.....	This man claimed damages because he had no farmer's crossing. The crossing has since been constructed for him. No award made.
Pierre Gagnon.....	do .....	do .....	150 00	.....	.....	Award postponed.
G. St. Pierre and his wife, Eloise Fraser.....	do .....	do .....	575 00	150 00	Dec. 3, 1877...	
Chas Lepage.....	do .....	do .....	202 66	Nil.	do .....	
Jean La-gis .....	do .....	do .....	33 33	.....	.....	This is a case arising from snow fence, and is specially reported on.
Etienne Patry .....	do .....	do .....	33 33	.....	.....	do
Basile Côté.....	do .....	do .....	Not stated.	Nil.	do .....	do
François Parent .....	do .....	do .....	112 00	Nil.	do .....	
Joseph Parent and Angèle Caron .....	do .....	do .....	204 00	Nil.	do .....	
Victor Réhel .....	Section No. 8....	do .....	220 00	do	do .....	
Jules Michaud .....	do .....	do .....	200 00	10 00	do .....	
P. Benville .....	do .....	do .....	300 00	Nil.	do .....	
Sylvain Lavoie.....	do .....	do .....	500 00	Nil.	do .....	
Alex de Champlain .....	do .....	do .....	65 00	30 00	do .....	
Oreste Côté .....	do .....	do .....	200 00	.....	do .....	
Julien St. Laurent. ....	do .....	do .....	Not stated.	40 00	do .....	Ruled out by Arbitrators.
A. Alfred Blais .....	do .....	do .....	50 00	10 00	do .....	
I. K. Ward.....	Land taken, &c., for Lachine Canal enlargement .....	Feb. 3, 1877...	40,899 75	26,135 00	Oct. 29, 1877...	
W. Evans.....	do .....	Feb. 3, 1877...	8,701 58	3,767 00	do .....	
L. Fautoux .....	do .....	do .....	9,442 68	5,000 00	do .....	

A. St. Denis .....	Land taken for Carillon Canal enlargement .....	March 12, 1877	3,200 00	297 00	Dec. 10, 1877...	
Estate late Hon. Wm. Chipman .....	Land taken, &c., by Interecolonial Railway for depôt grounds, &c., at St. John, N.B. ....	April 5, 1877...	84,140 00	24,000 00	Dec. 7, 1877...	Arbitrators have also awarded interest from 1st January, 1872.
John Elliott .....	Contract, extras, &c., Custom House, Toronto .....	June 16, 1877..	with interest 110,275 01	95,377 00	Aug. 20, 1877..	
F. X. Jary .....	Land taken for Lachine Canal enlargement .....	June 20, 1877..	2,981 76	1,194 00	Oct. 29, 1877...	
J. Caron .....	Damages, &c., to property resulting from construction of Interecolonial Railway, Section No. 8 .....	July 23, 1877..	Not stated.	20 00	Dec. 3, 1877...	
W. Simard .....	do do .....	do .....	200 00	40 00	do .....	
J. Larrivée .....	do do .....	do .....	366 66	49 00	do .....	
Maxime Thierry .....	Land taken, &c., for Lachine Canal enlargement .....	July 25, 1877..	Amount offered.			
Maxime & A. Latour .....	do do .....	do .....	4,629 51	4,629 00	Oct. 29, 1877...	
O. W. Stanton .....	do do .....	do .....	3,369 92	3,359 00	do .....	
Estate late Wm. Dow .....	do do .....	do .....	10,488 50	10,488 50	do .....	
Heirs Peter Jackson .....	do do .....	do .....	2,917 20	2,322 60	do .....	
J. B. Renand .....	do do .....	do .....	5,130 90	5,400 00	do .....	
E. Hudon, jun. ....	do do .....	do .....	.....	.....	do .....	Party fails to appear when called.
Chas. Gareau .....	do do .....	do .....	.....	.....	do .....	do
L. Bernier & Co. ....	do do .....	do .....	60 80	60 80	Oct. 29, 1877...	do
Estate of late J. Frothingham .....	do do .....	do .....	.....	.....	do .....	do
Seminary of Montreal .....	do do .....	do .....	5,385 69	5,385 69	do .....	
Mouise Iron Co. (south side) ..	do do .....	do .....	10,312 50	9,500 00	do .....	There was a clerical error made in the amount offered; amount should have been less.
do (north side) ..	do do .....	do .....	10,789 90	10,789 00	do .....	
do .....	do do .....	do .....	3,863 43	3,863 00	do .....	
Louis Desrosiers .....	Damages, &c., to property, resulting from construction of Interecolonial Railway, Section No. 8 .....	July 27, 1877...	Amount claimed.			
Theophile Mongrain .....	do do .....	do .....	100 00	30 00	Dec. 3, 1877 ...	
Sylvestre de Champlain .....	do do .....	do .....	Not stated...	Nil.	do .....	
Pierre de Champlain .....	do do .....	do .....	do .....	.....	.....	This is a case arising from snow fence, and is specially reported on.
Magloire Desrosiers .....	Damages, &c., to property, resulting from construction of Interecolonial Railway, Section No. 8 .....	do .....	200 00	39 00	Dec. 3, 1877...	do
Pierre Desrosiers .....	do do .....	do .....	100 00	Nil.	do .....	
Joseph Richard .....	Damages, &c., to property, resulting from construction of Interecolonial Railway, Section No. 1 .....	Aug. 9, 1877...	200 00	30 00	do .....	
Pierre Dubé .....	do do .....	do .....	100 00	Nil.	do .....	
Celestin de Champlain .....	do do .....	Aug. 11, 1877..	75 00	50 00	do .....	do
Victor Langlois .....	do do .....	Aug. 26, 1877..	Not stated...	.....	.....	do
		do .....	do	.....	.....	do

Claimant.	Subject of Claim.	Date of reference to Arbitration.	Amount claimed.	Amount awarded.	Date of Award.	Remarks.
Hypollite Theriault.....	Damages, &c., to property resulting from construction of Intercolonial Railway, Section No. 1.....	Aug. 25, 1877..	\$ cts. 200 00	\$ cts. Nil.	Dec. 3, 1877....	
Ross & McKay.....	Extra work, &c., contract, South Ingonish Harbour.....	Nov. 15, 1877..	13,773 96	.....	.....	
J. S. MacEwen.....	Extras, &c., contract, Bayfield Harbour.....	April 24, 1878..	16,182 28	.....	.....	
James Weldon.....	Land taken and damages to property resulting from Carillon Canal enlargement.....	do ..	1,178 00	350 00	May 18, 1878...	After the reference of this case to arbitration, Mr. Cowan, Chairman, was requested by the Minister to visit the locality and report on the matter. Mr. Cowan visited the place and reported on the 18th May, 1877, recommending the payment to claimant of \$350. The report was approved by O. C., the claimant accepting the \$350. This case referred to two members of Board only.
Mrs. D. W. Macdonell.....	Land taken for Cornwall Canal enlargement.....	June, 14, 1878..	Amount offered. 1,201 35	.....	.....	

F. H. ENNIS,  
*Secretary, O.A.*

OTTAWA, 22nd November, 1878.

## APPENDIX No. 18.

### BRITISH COLUMBIA.

PUBLIC WORKS DEPARTMENT,  
VICTORIA, BRITISH COLUMBIA, 22nd July, 1878.

SIR,—I have the honor to submit the following Report of the works under my charge during the fiscal year 1877-78, together with a detailed statement of amounts received on account of telegraph revenue, land sales, and rents during the past year.

#### *Penitentiary.*

This building is now complete and ready for occupation, with the exception of the mess utensils, bedding and stools for the prisoners' cells. All the accounts have been paid in full, excepting the balance of the claim of the contractors, which is still under consideration, and the amount which may be due to the caretaker as extra pay, whilst acting as clerk of works in charge of the erection of the dam. This latter amount of \$210 has since been authorized, and a credit for it is on its way. The dam has been successfully built of wood, with clay banking well tamped, and is very tight. The first attempt of the contractor, nowever, to finish it was a failure, owing to his neglect in not tamping the clay, thus allowing the water to break through underneath and lift up the greater part of the frame work. His next attempt was successful as he put in a sluice box to regulate the height of the water, which allowed him to ram the clay well in.

The 2-inch iron pipes, well coated while hot with asphaltum, have been laid, and the building is now provided, at its highest point, with a plentiful supply (504 gallons per hour) of pure cold water. The office furniture for the Warden's and officer's quarters, and that of the dining rooms for the prisoners, has been made and fitted up. Fifty iron bedsteads have been made and fixed in the cells. Two chapels, one for the Protestants and one for the Roman Catholics, have been fitted up with chancel furniture, pulpits, pews, reading desks, and with separate recessed portions for the female prisoners, have been fitted up for divine service. An accurate survey has been made of the Reserve, which has been enlarged so as to contain the water pipe track, and a written description of the length and bearings of the boundary lines has been forwarded to Ottawa for the purpose of proclamation in the *Gazette*. Most of the corners have been marked with rough hammered stone posts set firmly in the ground. The total contents of the Reserve is now 96.16 acres.

In order to lay the water pipes and build the dam, it was found necessary to pass through certain private lands, Lot 1 Block XIII, and to build the dam partly on the public street and partly on Lot 2, Block XIII. Permission was obtained from the Provincial Government to use the street, and offers were made by me to Messrs. Turner and McColl, the owners of the lands, of the sum of \$125 each, as compensation for any damage which might result therefrom. These offers were absolutely rejected. This was duly reported, and it was then decided that the right of way for pipes and dam should be acquired by arbitration, and I gave them notice of it, having first tendered them in writing the sums above mentioned. The Court of Arbitration sat at New Westminster in December last; Mr. Hugh Boyd acting for both the land owners, and I for the Government; Mr. W. D. Ferris J.P., having been appointed to act as umpire. The result of the arbitration was that Mr. Turner

was awarded the sum of \$200, and Mr. McColl the sum of \$75, for the damage to their lands respectively. The right of way through Lot 1, Block XIII, is 5 feet wide, and is granted for ever, with right of passage over it by the agents and workmen of the Department for the repairing of the pipes. The fees paid to arbitrators amounted to \$50, of which \$20 was to the umpire, and \$30 to Mr. Boyd, who had some distance to travel. Copies of the award and of all the correspondence and evidence taken on the subject have been transmitted to Ottawa.

The following is an abstract of all expenditure incurred on account of this work for the year.

Cost of dam—contract .....	\$350 00	
Extra work—sluice box.....	100 00	
Box for rose.....	10 00	
Clearing timber and chopping trees on line of trench .....	34 00	
		\$ 494 00
Trench—cutting and filling in .....		602 10
Pipe—3,481 feet of 2-inch pipe and asphaltum and supplying all cocks and connections, rose, &c.....		1,862 00
Furniture for offices, chapels, &c.....		2,310 00
Iron bedsteads—making.....	509 00	
Fixing in cell.....	119 00	
		628 00
Coal—freight and hauling for drying basement.....		259 00
Caretaker—wages .....	1,095 00	
“ “ acting as Clerk of Works .....	258 00	
		1,353 00
Arbitration—awarded to G. Turner.....	200 00	
“ “ W. McColl.....	75 00	
Fees to umpire.....	20 00	
“ 1 arbitrator .....	30 00	
		325 00
Surveys of reserve, pipe track, &c.....		168 87
Total expenditure. ....		<u>\$8,001 97</u>

#### IMPROVEMENT OF NAVIGATION.

##### *Victoria Harbour.*

No dredging operations have been carried on this year. The vessels have been laid up in charge of a caretaker. The punts have been lent at various times with the object of having them tarred and cleaned without expense to the Government. The decay mentioned in last Annual Report in the upper works of the dredge, is, I fear, extending, and should be at once checked, to prevent its getting to the frame and timbers of the vessel. The expenditure has been :

Wages of caretaker .....	\$480 00
Repairs, towage, paints and oils, &c .....	61 64
	<u>\$541 64</u>

##### *River Cowichan.*

The amount of \$1,500 having been authorized for clearing the obstructions from this river, I proceeded to the Cowichan Lake on the 28th May, returning to Victoria on the 5th June. The lake is about 22 miles long, and 22 miles from the mouth of the river, which latter is for nearly half its course very rapid, the average current being about 5 miles an hour. A great many drift piles of fallen timber exist—on

them is about 400 yards long. The effect of these drifts is to divert the river from its natural bed, to increase the velocity of the current immediately below them, to form shoals, and, during the season of freshets, to cause the water to overflow its banks. The timber on the upper portion of the river and on the shores of the lake is simply magnificent, consisting of Douglas fir, white pine, cedar, hemlock and spruce, with very large alder, maple and poplar; the former are of large growth, from 3 to 7 feet in diameter, and without a branch for 150 to 200 feet. It is estimated by those capable of judging, that this region contains not less than two thousand million (2,000,000,000) feet of marketable timber, board measure. There are large tracks of good land along the banks of both river and lake, the former is now subject to overflow, but the clearing of the river will certainly diminish the tendency to do so. When cleared there will be no difficulty in running down booms of logs. On my return I prepared a specification and called for tenders for this work, and on the 28th of June executed an agreement with Joseph Nicholson for its performance, on or before the 31st of March next, for the sum of \$1,345, of which the sum of \$700 is payable when the clearing and burning is performed to my satisfaction, and the balance of \$645 during the month of April next after inspection and approval. I transmitted copies of the contract, specification and bond to Ottawa, in letter dated 5th instant. The expenditure therefore has been,

Passage money of self and cook, Indian's wages, canoe hire, &c .....	\$51 50
Provisions for the party.....	24 75
Cartage of tents, &c .....	2 50
	<u>\$78 75</u>

*Beaver Rock, Victoria Harbour.*

The operation of raising the stone shattered by the blasting in 1876 has been continuously carried on by means of the diving bell or caisson, with the following result:—

Amount removed in fiscal year, 1876-77 .....	253 tons.
"    "    "    1877-78 .....	1,324 "
	<u>1,577 "</u>
Estimated amount to be removed.....	1,768 "
Leaving still to be removed.....	<u>191 "</u>

Under the most favorable circumstances it has been found impossible to remove more than 160 tons a month, the average of the past year gives 110.3 tons per month.

Most of the rock has been sold to persons engaged in erecting sea walls in front of their wharves. One-third of the amount of those sales will be paid over to the Government.

Total amount of contract .....	\$11,950 00
Amount certified under progress estimate No. 1, less drawback .....	\$2,210 63
Amount certified under progress estimate No. 2, less drawback.....	2,240 63
Amount certified under progress estimate No. 3, less drawback .....	2,240 62
	<u>6,721 88</u>
Balance in hand payable on completion of work.....	<u>\$5,228 12</u>

### *Telegraph maintenance.*

During the month of February a bad break occurred in the submerged cable across Haro Strait. The Superintendent recovered about two miles of the broken cable, when it broke, and the other 7,000 feet, which were very old and weak, were lost. A sailing ferry-boat was at once put on to maintain the communication, at a cost, for the boat-master and two operators, of \$12 a day. In March the repaired cable was laid, but, owing to the stormy weather, it was found impossible to stretch it to its original point on San Juan Island, and it was therefore landed at Henry Island, and the connection made complete by means of a land line  $1\frac{1}{2}$  miles long, and by a piece of old core patched up for the purpose about 800 yards long. We have not on hand at this moment any submarine cable, but I have written to Lefebvre & Co., of London, under date of 20th of June, to send out overland  $3\frac{1}{2}$  statute miles, which will be of a quality superior to that we usually obtain in San Francisco, and much cheaper; in fact the  $3\frac{1}{2}$  miles will be delivered here at the same price, as two miles from the latter place. The following is an abstract of the expenditure under this head of service for the year :—

Salaries .....	\$18,120 00
Rent .....	396 00
Postage.....	84 00
Travelling expenses of Superintendent.....	380 00
Transportation of operators.....	260 00
Material and supplies.....	593 00
Printing.....	275 50
Cable repairs, small items returned in monthly accounts.....	1,022 44
Light, fuel, cost of men and horses on line, extra men and horses for repairs, freight, ferriage, stationery, advertising, &c.....	3,388 17
Submerged cable, purchase of 2 miles in San Francisco .....	\$2,985 45
Freight.....	27 41
Duty.....	515 68
	<hr/> 3,528 54
New poles—cutting and delivering 2,835 at 50c. per pole, from Yalo to Cache Creek, 110 miles.....	1,417 50
Cable repairs, and hire of "Sir James Douglas," &c....	3,197 79
Subsidy to Western Union Telegraph Company for 12 months .....	4,000 00
	<hr/> \$36,662 94
Amount appropriated for year .....	36,720 00
Balance unexpended.....	<hr/> \$57 06

### *Public Works Advertising Account.*

The following expenditure under this head of service has been incurred during the year :—

Advertising steamers to avoid Beaver Rock .....	\$ 8 00
Advertising Tenders, River Cowichan .....	11 00
	<hr/> 19 00

*Repairs to Buildings.*

The following repairs and additions have been made during the year, the cost of which is shown below.

*Post Office Building, Victoria.*

The roof has been painted as usual, and the mortar of the five walls has been raked out and replaced with cement. The latrines have been converted into water-closets and fitted with metal glazed pans with  $\frac{1}{2}$ -inch flushing pipes. Hose and cocks have been fitted to assist in case of fire.

*Indian office, New Westminster.*

Part of the old Assay Office premises has been remodelled and converted into an office for the Mainland Commissioner, with suitable Indian waiting rooms, &c.

*Custom House, Kootenay.*

Certain necessary repairs made by the collector have been authorised, and the cost thereof refunded to that officer.

*Custom House, Victoria.*

Water cocks, hose, &c., have been supplied to this building to assist in case of fire. Broken windows, &c., have been repaired.

Amounts expended on foregoing works:—

Victoria Post-Office:—

Hose, cocks, &c.....	\$ 94 50
Fitting 4 water closet pans, $\frac{1}{2}$ -inch piping, &c.....	60 00
Cementing five walls .....	50 00
Painting roof .....	35 00
Trap-door lock, &c.....	5 00

\$244 50

Indian Superintendent's Office—contract for alterations... 500 00

Kootenay Custom House—repairs to floor..... 10 00

Custom House, Victoria:—

Hose, cocks, &c.....	\$207 25
Windows, lock, &c.....	4 50

211 75

\$966 25

*Salary and Contingencies.*

The following expenditure has been incurred during the year under this head of service:—

Resident Engineer.....	\$2,199 96
Office assistance, tracing plans, &c.....	79 00
Messenger—wages .....	180 00
“ washing office towels.....	8 00
Fuel.....	28 50
Inspection of works at New Westminster.....	114 50
Water rates, \$8; service to Custom House, \$10.....	18 00
Stationery .....	29 99
Telegrams on service (part of year).....	11 60
Printing voucher forms, &c.....	7 50
Post Office box, stamps, &c.....	11 25

\$2,688 30



### *Revenue Telegraph Maintenance.*

The amount received on this account is as follows :—

	Dep. receipt.	
Refund by Oppenheimer Bros., of cost of repairing donkey engine.....	2,545	\$ 21 60
Revenue for July.....	2,669	549 25
“ August.....	2,728	688 65
“ September.....	2,942	532 45
“ October.....	41	794 55
“ November.....	172	458 80
“ December.....	287	653 30
“ January.....	508	863 55
“ February.....	548	226 71
“ March.....	667	952 34
“ April.....	910	1,035 49
“ May.....	1,054	1,784 48
“ June (part).....	1,153	238 18
		<hr/> \$8,790 35 <hr/>

By an Order-in-Council dated 30th April, the tariff of charges on messages transmitted over the line has been lowered, which will take effect from the 15th June. It is hoped, however, that in view of the improved prospects of the Cariboo country, from the recent discoveries of gold-bearing veins of quartz, and the consequent more frequent use of the line, that no diminution of the revenue will result therefrom.

### *Rents of Lots and Buildings.*

The following is the account of all rents received by me from tenants holding under the Dominion Government, to the 15th April. Since this date, in accordance with instructions received, I have ceased to collect these rents, the duty of doing so having been vested in the Collector of Inland Revenue at Victoria.

Henry Holbrook, Camp premises.....	\$115 50
Jonathan Morey, Assay Office do .....	27 00
Adolphus Peel, do do .....	47 50
(Commission paid for collecting this \$2.50)	
Edward Dickonson, Government House.....	90 00
John Kinsman, do do .....	60 00
	<hr/> \$340 00 <hr/>

### *Sales of Government Property.*

The third instalment with interest has been paid by Mr. J. K. Suter, on E $\frac{1}{2}$  Lot 5, Block XIV, New Westminster, as follows :—

Third instalment, as agreed.....	\$180 00
Interest 1 year 10 months at 7 per cent. per annum.....	23 10
	<hr/> \$203 10 <hr/>

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*Lot 4, Block V, New Westminster.*

The balance due on purchase money of this lot has been paid by Messrs McNamara and McGill, and a written description of the boundary lines, with plan of the lot has been sent to Ottawa.

Balance of purchase money paid, \$725.00.

I have the honor to be, Sir,

Your most obedient servant,

B. W. PEARSE,

*Resident Engineer.*

F. BRAUN, Esq., Secretary,  
Public Works Department,  
Ottawa.

## APPENDIX No. 19.

### PRINCE EDWARD ISLAND RAILWAY.

#### RAILWAY DEPARTMENT,

MONTREAL, 1st October, 1878.

SIR,—I now beg to hand you the accounts shewing the working of the Prince Edward Island Railway, for the year ended 30th June, 1878.

I enclose the following 13 returns, viz :

- No. 1. Capital account.
- " 2. Detailed statement of capital expenditure.
- " 3. Revenue account.
- " 4. Locomotive power. (Abstract 1.)
- " 5. Car expenses. ( " 2.)
- " 6. Maintenance of way and works ( " 3.)
- " 7. Station expenses ( " 4.)
- " 8. General charges. ( " 5.)
- " 9. Renewals of permanent way. ( " 6.)
- " 10. Monthly statement of receipts.
- " 11. Statement of general store account.
- " 12. General balance.
- " 13. Comparative statement of averages.

I also enclose the reports of the Superintendent, the Engineer and the Mechanical Superintendent.

#### CAPITAL ACCOUNT.

The total cost of the Railway at the date of the last report was \$3,403,367.84, and there has been charged during the last year the sum of \$6,551.86, making the total cost up to 30th June, 1878, \$3,409,919.70.

The outlay of \$6,551.86 is for the settlement of matters which occurred prior to the opening of the railway, and for a new station at Bredalbane.

The railway work-shops and rolling stock are in a fairly satisfactory condition, the steel rails laid in, tending materially to improve the state of the permanent way.

The fencing has also been considerably improved, but considerable expense will still be required before it is in a completely satisfactory state.

Considerable additions have been made to the snow fencing, much of which has also been moved further back from the rails.

The regularity of the trains in winter has consequently been much improved.

The change of the line at Souris, for which an appropriation was made last session, has been commenced and will probably be completed during the present fiscal year.

The new station will be in operation within a couple of months, but the shipping wharf cannot be ready until next season.

#### REVENUE ACCOUNT.

The gross receipts were.....	\$135,899 60
Against, in the previous year.....	130,664 92
Shewing an increase of.....	\$ 5,234 68

The passenger receipts, as compared with the previous year, shew an increase of \$4,653.04, with an increase of 17,950 in the number carried.

The freight traffic shews a decrease of \$1,052.74, with a decrease of 2,116 tons carried.

The traffic shewed a fair increase up to the close of last winter, but from that date declined heavily owing to the great depression of business throughout the Island.

No signs of this depression passing away have yet been developed, and the traffic is in consequence not satisfactory. Shipbuilding on the Island, during the last year, has greatly diminished, and the mackerel fishery is reported to have been unsatisfactory.

#### WORKING EXPENSES.

The ordinary expenses for the year were .....	\$194,135 04
And the charge for renewal of rails, fencing, &c.....	27,464 45
	<hr/>
Making a total of.....	\$221,599 49

For the previous year the figures were :

Ordinary Expenses.....	\$210,329 08	
Renewals .....	18,266 17	228,595 25
	<hr/>	<hr/>
Shewing a total decrease of.....	\$	6,995 76

The loss on working the line after defraying all expenses for last year.....	\$85,699 89
Against for the previous year.....	97,930 33
	<hr/>

Shewing an improvement of..... \$12,230 44

The loss for the three years the railway has been open was as follows :

The year ended 30th June 1876.....	\$96,869 47
“ “ 1877.....	97,930 33
“ “ 1878.....	85,699 89

At the end of the present year 1,500 tons of steel rails will have been laid in the track between Charlottetown and Summerside. The light iron rails on the very sharp curves are wearing rapidly. It is doubtful if 500 tons a year will henceforth properly maintain the railway.

It would be very desirable if the sharpest curves were taken out, which would shorten the distance, and greatly improve the running of the trains.

The locomotive expenses are satisfactory owing to the improvements which have been made in the engines. The cost per engine mile run was 19.34c. as against 22.98c. for the previous year.

The car expenses will continue to be heavy until the improvements which are steadily progressing are completed.

19,572 sleepers were put in the track. This number will yearly increase for some time.

35,000 sleepers will be required for the current year to keep the road in proper condition.

The ballasting and lifting of the line has been fully attended to; and this with the carrying out of a system of drainage has much improved the track.

The bridging has also been much repaired and strengthened.

Some of the stations are being repaired and dwellings added for the agents. This will be gradually carried out until all are completed.

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**STORES.**

The stock of stores on 30th June, 1878, amounted to :

Ordinary stores.....	\$31,301 12
Coal .....	2,455 06
Rails and fastenings.....	18,089 39

Total.....	\$51,845 57
------------	-------------

The stock for the previous year stood at.....	\$48,613 43
---	-------------

The item of rails will increase as the iron rails are replaced by steel. The price of old rails is at present extremely low, and the demand for them very limited.

The total cost per train mile run during the year was as follows :

Ordinary expenses.....	68.78cts.
Renewals .....	14.14 "

Total .....	82.92cts.
-------------	-----------

Against for the previous year :

Ordinary expenses.....	85.74 cts.
Renewals.....	8.14 "

Total .....	93.88 cts.
-------------	------------

shewing a reduction per train mile run of 10.96c.

The expenses are now about as low as they can well be, without diminishing the accommodation afforded ; and the traffic at present is not quite equal to the figures of last year, owing to the causes already referred to.

I have the honor to be, Sir,

Your obedient servant,

C. J. BRYDGES,

*General Superintendent Government Railways.*

F. BRAUN, Esq., Secretary,

Department of Public Works,

Ottawa.

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## PRINCE EDWARD ISLAND RAILWAY.

### SUPERINTENDENT'S REPORT.

GENERAL OFFICES,

CHARLOTTETOWN, August 23, 1878.

SIR,—I beg to submit herewith reports relating to the operations of the Prince Edward Island Railway, for the year ending 30th June, 1878.

*Capital Account.*—The only item of capital account actually incurred during the past year was for the erection of a station building and platform at Brodalbane, which was much required.

The new building is the most commodious, and has the best appearance of any way station on the road.

I would again recommend that 6 passenger excursion cars be added to our stock. These are absolutely required. We have a very fair excursion business during the summer months, and are compelled to use ordinary box cars, in order to supplement the passenger cars; thus every season being put to the expense of putting in rough seats, in order to make them at all available. The very uncomfortable and poor accommodation thus furnished to excursionists is injuring the business very much. These cars can be built in our own shops, without any additional expense and cheaper than elsewhere.

The want of storage accommodation in Charlottetown is being felt more severely every year, and militates against our business. Produce dealers having to pay cartage at Charlottetown in addition to freight, are not able to give so high a price at way stations as they otherwise would, thus causing farmers to haul their produce to town rather than accept the low price offered. Again, as stated in my report last year, cars are very much delayed when vessels do not arrive promptly, there being no place into which the cars may be discharged, we are compelled to allow the produce to remain in them, thus crippling us for want of cars in our very busiest season.

I would recommend that a warehouse be constructed with a capacity of 150,000 bushels, which would enable us to discharge all cars promptly, virtually adding to their carrying power. A storage charge upon all grain going into said warehouse (to which shippers would not object) would, I have not the least doubt, pay a fair rent on the cost of the building. The practice heretofore has been, for merchants to refrain from buying until the fall fleet came in, when a great effort had to be made to get the vessels loaded and away before the ice formed. Now with such a warehouse they could begin to buy along the line of the railway as soon as the threshing would begin, and have the warehouse full before the fleet arrived, which also could be loaded and despatched much earlier in consequence. It would likewise be of great service for the storage of grain purchased during winter, for shipment by the spring fleet.

The distance from Cardigan to Mount Stewart is 18 miles. The heaviest snow drifts and greatest detentions in winter occur near Baldwin's, which is about midway between these stations. During the past two winters it has been necessary to open telegraph offices in the tank-house there.

Considerable passenger and freight business is being done at Baldwin's, which from its position, with roads radiating in all directions, would with the convenience of a regular station, do much more.

The distance from Royalty Junction to Mount Stewart is 16 miles.

We find it very inconvenient to be without a telegraph or crossing station for that distance. Bedford which is situated about midway, does a fair business, and with a regular station would do more.

Agents dwellings are being erected at Tignish, O'Leary, Port Hill, Mount Stewart and Souris, in addition to those already in use. The following stations are yet unprovided in this respect, viz: Alberton, Hunter River, North Wiltshire, Georgetown, Cardigan and St. Peters.

I would therefore respectfully urge the necessity of erecting during the current year, station buildings with agents apartments at Bedford and Baldwin's, and agents residences at Alberton, Hunter River, North Wiltshire, Georgetown, Cardigan and St. Peters.

Souris to St. Peters is 21 miles.

Harmony is only 5 miles from Souris and does no business, being so close to the last named place, it is of no use as a crossing station.

Bear River is about midway between Souris and St. Peters, and does the best business on that branch, being also well situated for a crossing station.

I would therefore recommend that Harmony Station be closed, and reduced to the rank of a flag station; and that Bear River be made a regular station, and the station building from Harmony removed thereto.

*Revenue Account.*—We are happy to be able to shew a continued improvement on this account, consisting of an increase in receipts of \$5,234.68 and a decrease in expenditure of \$7,087.71.

Earnings, year ending 30th June, 1877...	\$130,664 92	for 1878	\$135,899 60
Expenses, ordinary working do ....	210,329 08	do	194,135 04

Renewals	Loss.....	\$79,664 16	do	\$58,235 44
do	do ....	18,266 17	do	27,464 45

Gross loss upon year's operations.....	\$97,930 33	do	\$85,699 89
--	-------------	----	-------------

Year ending 30th June 1877—Gross receipts.....	\$130,664 92
do 1878— do .....	135,899 60

Increase.....	\$ 5,234 68
---------------	-------------

Year ending 30th June 1877—Gross expenditure.....	\$228,595 25
do 1878— do .....	221,599 49

Decrease .....	\$ 6,995 76
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Loss for 1878 less than upon the previous year by.....	\$12,230 44
--	-------------

Working expenses per mile of road 1877.....	\$1,073 11
do do 1878.....	937 79

Decrease.....	\$ 135 32
---------------	-----------

do	per train mile 1877.....	85.74 cts.
do	do 1878.....	68.78 "

Decrease.....	16.96 "
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The year 1877-78 was upon the whole favourable for railway purposes—a fine harvest and a comparatively mild winter. With an abundant harvest and a fair success in the fishing business, we at one time anticipated much larger earnings. On account, however, of low prices, produce moved very slowly. Oats were held in granary by farmers, and even now (August 1878) large quantities remain in the farmers hands. For potatoes there was almost no demand. By descriptive statement herewith you will observe that shipments of potatoes over the road dropped from 174,911 bushels in 1877 to 60,302 bushels in 1878. Also oats fell from 628,792 bushels in 1877 to 571,420 bushels in 1878—almost every other item of freight, however, shewing a fair increase.

The passenger business has recovered the decline of the previous year, shewing an increase of 17,950 passengers and \$4,658.04, the receipts for each passenger being for 1877, 64.57c. and for 1878, 58.34c., or a decrease per passenger of 6.23c. caused by the most general use of return and second class tickets.

*Working expenses.*—We have pleasure in being able to point to a saving in working expenses for the year of \$16,194.04. Of this, \$4,289.18 was in locomotive power, principally in "repairs to engines, and tenders" and in "water including pump and tank repairs."

Beginning the year with locomotives, machinery and tanks in good effective condition, we have been able with a moderate outlay to maintain that efficiency.

Car expenses are about the same as for the previous year, and will continue heavy until the cars are all more or less renewed, this being rendered necessary by the inferior nature of the original rolling stock.

There is a decrease of \$9,564.82 in expenditure on account of maintenance of way and works. This saving has been effected mainly in clearing ice and snow and in repairs to snow ploughs, flangers and tools.

The winter 1877-78 set in very severely—storm followed storm until about the middle of February, when springlike weather began, and continued until the end of the season. During the stormy period, the snow and A fences did excellent service. Our steam ploughs also enabled us to clear the track where the snow banks did obstruct, so that our trains were not detained beyond two or three hours at any time.

You will observe also that there is a decrease in repairs to "Roadway, fences and semaphores" and repairs to buildings.

Station expenses are only \$918.32 greater than last year, although three additional stations were maintained.

In general charges there is a decrease of \$3,727.26 showing, a saving in every item under this head, excepting "damages to men, animals and goods," in which there is an apparent increase of \$421.81. This may be explained by the fact that during the previous year the sale of unclaimed goods realized \$412.17 which was deducted from this account, whereas there has been no sale during the year 1877-1878. The amount \$1,591.24 paid for "damages to men, animals and goods" consists greatly of claims for animals killed on the track, and will continue large until the whole road is properly fenced.

*Stores.*—Our purchases during the past year have been light, \$69,773.17 against \$103,315.99 for the previous year. Our stock on hand at June 30, is \$51,845.57 against \$48,613.43 for 1877, the increase being in rails and fastenings on hand.

We are paying the same price for coal as last year, viz: \$2.69 per ton, purchasing from the same mine.

*Casualties.*—October 30, 1877, 5.40 p.m. Train No. 7 approaching Bredalbano station. Brakeman Thos. A. Cartmill killed—fell between two cars from which he had drawn the coupling pin. The cars passed over him, causing death in a few minutes thereafter.

Verdict at Inquest:—"That on the 30th October instant, the deceased came to his death by falling between two cars,—the train being in motion at the time."

December 19, 1877—7 a.m. Train No. 1. Engine driver Hendry and fireman Trainor, very severely scalded but not permanently injured. When approaching Montrose station, the plug which supports the brick arch in the fire box, was knocked off by the fireman when stirring the fire—the steam escaped in great volume, filling the cab and scalding the inmates.

January 15, 1878.—9.23 a.m. Train No. 5. Brakeman James McDonald had his arm crushed while coupling cars at St. Peter's. Has since recovered perfectly.

May 8, 1878.—6.42 p.m. Baggage man McDonald, wrist broken while coupling cars at North Wiltshire. Not seriously hurt.

We have again the pleasure of reporting that no passenger has been either killed or injured upon this Railway.

I have the honor to be, sir,

Your obedient servant,

W. McKECHNIE,

Superintendent.

C. J. BRYDGES, Esq.,

General Superintendent of Government Railways.



## PRINCE EDWARD ISLAND RAILWAY.

DESCRIPTIVE STATEMENT of Freight Earnings for the Year ended 30th June, 1878.

Description of Freight.	Quantities.		Tons.		Amount.	
	1877.	1878.	1877.	1878.	1877.	1878.
					\$ cts.	\$ cts.
Oats..... Bush.	628,792	571,420	10,699	9,719	14,178 30	13,291 90
Wheat and other grains..... "	2,030	3,759	60	110	102 71	216 76
Potatoes and roots..... "	174,911	60,302	5,434	1,676	7,470 84	2,061 81
Flour..... Brls.	29,437	36,293	2,945	3,630	4,758 85	5,884 37
Mackerel..... "	3,053	5,898	458	885	589 14	1,296 83
Herring..... "	2,615	3,462	394	528	632 31	825 84
Cod and other fish..... "			244	234	425 87	483 98
Oysters..... "	3,222	3,032	322	303	534 18	500 49
Fish barrels..... No.	6,394	11,959	100	174	323 71	595 27
Timber, hewn and unbewn..... C. ft.	241,245	226,373	6,791	6,333	6,082 83	6,470 79
Lumber, sawn..... "	1,188,380	1,015,097	1,524	1,355	1,338 69	1,161 55
Shingles..... M.		6,768	585	570	650 75	642 07
Cordwood and tanbark..... Cords	837	1,245	1,351	1,849	965 20	1,524 81
Coal..... Cars.	59	74	481	582	332 55	342 84
Lime..... Brls.	1,453	781	181	232	198 74	213 06
Limestone..... Cars.	46	58	379	487	203 16	245 12
Brick and building stone..... "	38	57	303	503	205 35	347 30
Mussel mud..... "	27	82	270	755	170 10	328 53
Salt..... "			347	575	380 86	576 15
Live stock, all kinds..... No.	1,823	1,979	469	575	1,005 12	1,343 96
Pressed hay..... "				167		161 90
Fresh beef..... "			29	36	107 12	103 20
Pork, in carcass..... "			213	162	577 68	361 05
Pork, in barrels..... No.	1,193	622	179	108	294 75	270 40
Butter..... "			20	21	77 92	82 11
Eggs..... Pkgs.	6,243	8,631	240	316	445 80	763 48
Merchandise..... "			7,031	7,018	20,053 31	20,850 95
Wharfage, storage, &c..... "					807 52	1,191 17
Total.....			41,039	38,923	63,213 43	62,160 69

## STATEMENT OF PASSENGER TRAFFIC.

	1877.	1878.
Total number carried.....	93,478	111,428
Receipts.....	\$60,357 41	\$65,015 45
Receipts for each passenger.....	0 64 57	0 58 34

## PRINCE EDWARD ISLAND RAILWAY.

## ENGINEER'S DEPARTMENT,

CHARLOTTETOWN, 29th June, 1878.

SIR,—I have the honor to submit the following report on the affairs of my Department for the fiscal year now ended.

*Maintenance.*

The total cost of maintenance of road, including ballasting, repairs to buildings, bridges, wharves, &c., together with removal of ice and snow was \$62,928.42 as against \$72,493.24 for the year ended 30th June, 1877, being a decrease of \$9,564.82. During the year just ended the total train mileage run, was 267,233 at a cost for maintenance of road of 23.6 cents per train mile as against 243,494 train miles for year ended 30th June, 1877, at a cost of 29.7 cents per train mile. Thus, while there has been an increase of 9.7 per cent in the amount of traffic, there has been a decrease of 13 per cent in the absolute cost and a decrease of 20.6 per cent in the relative cost of maintaining the road.

Under the head of "repairs of track" mainly representing the wages of section men a sum of \$30,663.20 has been expended as against \$36,282.79 for the same item last year, being a decrease of \$5,619.59. The length of line being 198.5 miles, the cost of this item, this year, was thus \$153.47 per mile per annum, or 49 cents per mile per diem. There are 31 section gangs, being an average of 6.4 miles for each gang. Each gang average 2.5 men per diem.

A sum of \$4,456.16 has been expended on ballasting. 2,600 cars of ballast were distributed over various parts of the line at the rate of 100 cars per mile; thus giving a lift of about 4 inches on 26 miles of the line. The cost was \$1.71 per car, and this includes the cost of getting, filling, train hire and part of the cost of packing into the track—16,889 train miles were run in performing this service.

89½ tons of iron rails have been used in repairs, lengthening sidings &c., at a cost of \$1,538.73. The cost of labour and conveyance is covered by this.

11½ tons of fish-plates were used in repairs.

15½ tons of track spikes have been used at a cost of \$1,065.37.

A sum of \$1,654.00 has been expended on frogs. 6 patent reversible cast steel frogs are included in this.

Much trouble has been caused by the frequent breaking of the cast iron frogs originally placed in the track, and these frogs are being gradually replaced by cast steel frogs, iron rail frogs and steel rail frogs.

A sum of \$2,562.24 has been expended on bridges—9 bridges, representing a total length of 368 feet, were widened with floor timbers, and strengthened by the addition of guard stringers—81,500 feet B. M. of material, have been used in this work. The entire length of the bridging on the line is 2,462 feet.

20 new timber culverts have been put in on various parts of the line.

72 pairs of cattle guard stringers have also been renewed. The total cost of this was \$883.70.

A sum of \$568.77 has been expended on repairs of Summerside wharf. The greater part of this has been required for making good settlements that have taken place in the wharf.

A recent examination has disclosed the fact that the foundation timbers are much eaten by sea worms, and that this is the cause of the settlements. Extensive repairs will be required on this wharf during the coming year.

A sum of \$1,855.21 has been expended on repairs of fencing as against \$967.36 for the corresponding item last year.

Under the head of station yards and approaches, a sum of \$1,246.36 has been expended as compared with \$1,315.73 for last year.—The work done has been grading station yards, making proper road approaches and extending sidings.

The total length of siding laid during the year was 0.85 mile.

The entire length of sidings on the line (inclusive of ballast sidings) is now 10.14 miles.

For removing ice and snow \$2,571.35 has been expended, as against \$7,617.23 for the previous year, being a decrease of \$5,045.88. So large a decrease is undoubtedly very largely owing to the protection from snow that has been provided by the erection of snow fences.

I beg to enclose a comparative statement of the cost of maintenance of road for the years 1875-76,—1876-77 and 1877-78. It is gratifying to be able to point to a steady decrease in the cost, and at the same time to be able to report that the line has been maintained in a thoroughly efficient manner, and many permanent improvements effected.

No stronger proof of the efficient condition of the track can be adduced, than the fact that throughout the whole year, just ended, we have not had a single "run off."

The total length of line maintained is 198½ miles including the Cascumpec and Souris wharf tracks.

No accidents or casualties worthy of mention have occurred in my Department.

#### *Renewals.*

A total sum of \$27,464.45 has been expended on renewals (see statement No. 9.) Four and a half miles of the line have been laid with steel rails. 1½ mile was laid from Royalty Junction westward and 3½ miles from Hunter River westward. 352¾ tons of steel rails were used at a cost including labor and train hire of \$10,111.58, being \$28.66 per ton. This is the net cost of the steel rails, after they have been credited with the value of the iron rails taken up. The laying of this quantity of steel, liberated 286 tons of iron rails. The value of these, at \$15 per ton, was placed to the credit of the steel rail account. Of the foregoing quantity of steel rails 97 tons were obtained in the autumn of 1876, from the Cammells Steel Works at a cost of \$44.25 per ton delivered in Charlottetown, and 255¾ tons were obtained in the autumn of 1877, from the Dowlais Steel Works, at a cost of \$35.89 per ton delivered in Charlottetown. The cost of labour and train hire, required to lay the 4.5 miles was \$930.46, being at the rate of \$207.75 per mile.

There are now altogether 9¾ miles of line laid with steel rails.

A total sum of \$10,617.48 has been expended on account of fence construction.

This total was made up in the following manner :

Additional land purchased for snow fence.....	\$1,471 71
New snow fence erected.....	4,420 31
Snow fence moved back.....	441 15
A Fence .....	1,298 30
Pole fence.....	1,744 17
Wire fence.....	1,241 84

Total..... \$10,617 48

18.24 acres of land in all were purchased in small strips, 25 feet wide throughout different parts of the line for the above sum, being at the rate of \$80.68 per acre, and this includes allowance made for damage done to crop

Fifty-five different parties were dealt with in purchasing this land.

The new snow fence erected, amounted to 1895 rods or 5.92 miles.

In order to arrive at the actual cost of this it is necessary to add a sum of \$650 (charged in the capital account of last year) to that above stated, and to deduct 240 rods built from material on hand. The cost will thus be found to be \$3.06 per rod.

This covers all conveyance of material, labour, inspection &c. 381,566 feet of lumber were used in the erection of this fence: it was entirely purchased on the Island at an average price of \$8.06 per M. feet, 3,200 posts were used. These were 12

feet in length and were obtained from A. Callaghan and James Barclay at the low average price of 10 cents per post.

All material required in the erection of the fence was purchased by the Engineers department, and supplied to the parties who were engaged in the work of erection. 60 cents per rod was paid for the labour of erection, and ten contractors were engaged in the work.

The total amount of snow fencing now erected on the line is 8,015 rods, or 25 (single) miles,

The sum paid for moving snow fence covers the moving of 519 rods,—85 cents per rod was paid for pulling down and re-erecting the fence.

The A fence is a portable fence that can be thrown down in winter.

The present board fence was altered to this style. 5,662 rods—17.7 miles were so altered at a cost of \$1298.30, being 23 cents per rod.

The pole fence was erected on part of the line to the west of Summerside, where only the original wire fence existed, and which was utterly inadequate for the protection of the line. 2,781 rods or 4.35 double miles of this fence, were put up at a cost of \$1,744.17, being 62  $\frac{3}{4}$  cents per rod. This covers the cost of all labour and material. Three contractors were employed on the work,

5  $\frac{1}{2}$  double miles or 3,544  $\frac{1}{2}$  rods of wire fence were erected, from Alberton eastwards. The wire used was the top wire (being the strongest wire) off the old wire fence, where it had been removed.

Six strands of this wire were put on, and a board run along the top of the posts. Two contractors were engaged in the work of erection, and were paid 20 cents per rod.

The total cost of this fence, was \$1,241.84 or 35c. per rod. In this is included the cost of gathering up and distributing the old fence wire.

A sum of \$5,139.18 has been expended on renewals of sleepers. 19,572 were put in, being at the rate of 26c. per sleeper.

This covers first cost, expense of distributing and labor of putting into the track. The sleepers are mainly white hemlock, and were obtained by tender from Mr. James Barclay.

I have the honour to be, Sir,

Your most obedient servant,

GRANVILLE C. CUNNINGHAM,

*Engineer.*

C. J. BRYDGES, Esq.,

General Superintendent of Government Railways,  
Montreal.

## PRINCE EDWARD ISLAND RAILWAY.

MECHANICAL DEPARTMENT,  
CHARLOTTETOWN, 1st July, 1878.

SIR,—I beg to submit the report of my Department for the year ended 30th June, 1878.

Appended are the following statements:—

1. Statement of performance and cost of locomotives for the year.
2. Monthly statement of cost of locomotive power for the year.
3. Monthly abstract from locomotive returns for the year.
4. Monthly statement of car mileage for the year.
5. Statement showing number of locomotives and cars.

The locomotives are in very good order, except the tank engines, whose boilers are too small, and when hard worked the tubes leak at the firebox end, and require renewal oftener on that account. Everything else is in the best condition. Our expenses are much below last year's.

The car expenses differ very slightly from last year. A great deal has been done towards their improvement—13 first-class cars are now double seated, giving an increase of 117 sittings, which is equal to 3.25 cars over the original accommodation.

Twelve roofs have been opened in order to stay them, otherwise it was impossible to keep them from leaking in wet weather.

The ventilation has been doubled in the "Monitor." The fourteen cars have been furnished with large wheels and the trucks made to suit them.

These cars now ride much more pleasantly and turn the curves better. In future the expense on this class will diminish.

The second-class and postal cars will slightly increase in cost on account of the alterations on the trucks for the larger wheels, and the changing of two of the posts to second-class and baggage, as we are short of the latter for summer use. One of these has been used temporarily by the paymaster, but as we can spare one of the vans, which affords sufficient accommodation, it will be converted into a pay car.

The remaining vans will need very little repair the coming year.

The freight cars have run up their expenses on account of the rebuilding of three box cars, eight platforms and 57 new trucks, besides the ordinary repairs and strengthening of the old stock.

We will hold back on the building of the trucks to wear out the small wheels, but the old box car bodies and platforms will need close attention as they are rotting very fast.

The material of which they are built is spruce and birch, and is very perishable.

Although our freight cars have not increased in number, in rebuilding we make them carry 25 per cent. more.

By keeping on as we have begun, the cars, like the engines, will be made better, and the expenses will then decrease.

The engines and cars are kept neatly painted.

The four large and the five small ploughs are all in good order.

I have the honor to be, Sir,

Your obedient servant,

A. STRONACH,  
*Mechanical Superintendent.*

C. J. BRYDGES, Esq.,  
General Superintendent of Government Railways,  
Montreal.

# No. 1.—PRINCE EDWARD ISLAND RAILWAY.

[1878]

113

Dr.

CAPITAL ACCOUNT.

Cr.

1877.		\$ cts.	\$ cts.	1877.	\$ cts.
June 30...	To Cost of Road and Equipment to date.....		3,403,367 84	June 30...By Dominion of Canada.....	3,403,367 84
1878.				1878.	
June 30...	To Expenditure, year ended 30th June, 1878, classified as follows:—			June 30...By Dominion of Canada.....	6,551 86
	Loss on temporary opening of railway prior to completion .....	2,851 86			
	Roadway and works .....	1,700 00			
	Buildings, stations and water service.....	2,000 00			
	Total .....		6,551 86	Total .....	3,403,919 70

E. and O. E.

THOMAS WILLIAMS,  
*Accountant.*

CHARLOTTETOWN, P.E.I., 30th June, 1878.

## No. 2.—PRINCE EDWARD ISLAND RAILWAY.

DETAILED STATEMENT of Capital Expenditure, for the Year ended 30th  
June, 1878.

Account.	Expenditure.
	\$ cts.
Temporary working of railway during fall and winter of 1874 before regular opening..	2,851 86
Increased cost of breakwater at Charlottetown before opening of road .....	1,700 00
Station buildings at Bredalbane .....	2,000 00
Total .....	6,551 86

E. and O. E.

THOS. WILLIAMS,

*Accountant.*

CHARLOTTETOWN, P.E.I.,

30th June, 1878.

# No. 3.—PRINCE EDWARD ISLAND RAILWAY.

## REVENUE ACCOUNT, for Year ended 30th June, 1878.

Previous Year.	Expenditure.	Year ended 30th June, 1878.	Previous Year.	Receipts.	Year ended 30th June, 1878.
\$ cts.		\$ cts.	\$ cts.		\$ cts.
55,937 07	Locomotive Power, per Abstract 1.....	51,677 89	60,357 41	Passenger Traffic.....	65,010 45
39,231 39	Car Expenses do 2 .....	39,750 29	63,213 43	Freight do .....	62,160 69
72,493 24	Maintenance Way and Works, Abst. 3.....	62,928 42	7,094 08	Mails and Sundries, ..	8,728 46
22,757 03	Station Expenses do 4 .....	23,675 35	130,664 92	Total Receipts.....	135,899 60
19,830 35	General Charges do 5.....	16,103 09	97,930 33	Balance .....	85,699 89
210,329 08	Total Ordinary Expenditure.....	194,135 04			
	<i>Renewals.</i>				
18,266 17	Permanent Way, per Abstract 6. ....	27,464 45			
228,595 25	Totals.....	\$221,599 49	228,695 25	Totals.....	\$221,599 49

E. and O. E.

THOMAS WILLIAMS,  
*Accountant.*

CHARLOTTETOWN, P.E.I.,  
30th June, 1878.



## No. 4.—PRINCE EDWARD ISLAND RAILWAY.

## LOCOMOTIVE POWER.—(Abstract 1.)

	Amount.
	\$ cts.
Mechanical Superintendent's salary, Clerks, office and travelling expenses.....	2,568 11
Wages of Drivers, Firemen and Cleaners.....	12,432 47
Fuel.....	13,517 85
Oil, tallow, waste and small stores.....	2,433 84
Repairs to engines, tenders and engine tools.....	13,779 94
Water, including pump and tank repairs.....	5,348 44
Miscellaneous.....	1,597 53
Total.....	\$51,677 89

E. and O. E.

THOMAS WILLIAMS,

*Accountant*

CHARLOTTETOWN, P.E.I.,

30th June, 1878.

## No. 5.—PRINCE EDWARD ISLAND RAILWAY.

## CAR EXPENSES.—(Abstract 2.)

	Amount.
	\$ cts.
Repairs to passenger cars.....	8,586 22
do postal and baggage cars.....	396 47
do freight cars and vans.....	17,324 90
Wages of Conductors, Train Baggage Masters and Brakemen.....	9,137 67
Oil and waste for packing.....	1,040 31
Small stores and fuel.....	2,866 32
Miscellaneous.....	398 40
Total.....	\$39,750 29

E. and O. E.

THOMAS WILLIAMS,

*Accountant.*

CHARLOTTETOWN, P.E.I.,

30th June, 1878.

## No. 6.—PRINCE EDWARD ISLAND RAILWAY.

## MAINTENANCE OF WAY AND WORKS—(Abstract 3.)

	Amount.
	\$ cts.
Engineer's salary, Clerks, office and travelling expenses.....	3,671 06
Wages in repairing roadway, fences and semaphores.....	35,364 60
Rails, chairs and spikes.....	6,909 05
Sleepers.....	441 08
Timber and lumber for repairs to bridges, cattle guards and fences.....	6,808 98
Repairs to Wharves.....	854 29
do Buildings.....	3,709 58
do Snow ploughs, flangers and tools.....	2,398 43
Clearing ice and snow.....	2,571 35
Miscellaneous.....	0 00
<b>Total.....</b>	<b>62,928 42</b>

E. and O. E.

THOMAS WILLIAMS,

*Accountant.*

CHARLOTTETOWN, P.E.I.,  
30th June, 1878.

## No. 7.—PRINCE EDWARD ISLAND RAILWAY.

## STATION EXPENSES—(Abstract 4.)

	Amount.
	\$ cts.
Salaries and wages of Station Masters, Agents, Clerks, Telegraph Operators, Station Baggage Masters, Yard Masters, Switchmen, Watchmen and Laborers.....	16,931 14
Fuel, oil, light, stationery, tickets and other incidental expenses.....	6,744 21
Miscellaneous.....	0 00
<b>Total.....</b>	<b>23,675 35</b>

E. and O. E.

THOMAS WILLIAMS,

*Accountant.*

CHARLOTTETOWN, P.E.I.,  
30th June, 1878.

## No. 8.—PRINCE EDWARD ISLAND RAILWAY.

## GENERAL CHARGES—(Abstract 5.)

	Amount.
	\$ cts.
Superintendent's and Train Despatcher's salaries, Clerks, office and travelling expenses.....	6,502 35
Accountant and Auditor's salaries, Clerks, office and travelling expenses.....	4,788 19
Paymaster and Cashier's do do do .....	2,064 57
Advertising.....	699 40
Damages to men, animals and goods.....	1,591 24
Telegraph expenses (not including pay to Operators).....	203 23
Miscellaneous.....	254 11
<b>Total.....</b>	<b>16,103 09</b>

E. and O. E.

THOMAS WILLIAMS,  
*Accountant.*

CHARLOTTETOWN, P.E.I.,  
30th June, 1878.

## No. 9.—PRINCE EDWARD ISLAND RAILWAY.

## RENEWALS OF PERMANENT WAY—(Abstract 6.)

	Amount.
	\$ cts.
Rails and Fastenings.....	11,801 68
Sleepers.....	4,545 29
Fencing.....	10,617 48
Bridges.....	500 00
<b>Total.....</b>	<b>27,464 45</b>

E. and O. E.

THOMAS WILLIAMS,  
*Accountant.*

CHARLOTTETOWN, P.E.I.,  
30th June, 1878.

## No. 10.—PRINCE EDWARD ISLAND RAILWAY.

## MONTHLY STATEMENT OF RECEIPTS.

Months.	Passenger Traffic.	Freight Traffic.	Mails and Sundries.	Totals.
1877.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
July .....	8,336 67	4,319 67	716 33	13,372 67
August .....	6,625 21	4,596 79	713 33	11,935 33
September .....	6,185 65	4,546 62	725 33	11,457 60
October .....	6,313 15	6,454 33	733 33	13,500 81
November .....	6,464 87	11,413 17	714 33	18,592 37
December .....	5,756 38	6,023 71	735 83	12,515 92
1878.				
January .....	4,187 81	4,712 65	714 33	9,614 79
February .....	2,754 95	2,336 65	722 33	5,815 93
March .....	3,257 44	3,484 68	720 33	7,462 45
April .....	4,778 19	3,426 87	807 33	9,012 39
May .....	5,332 09	7,187 73	714 33	13,234 15
June .....	5,018 04	3,655 82	711 33	9,385 19
Totals .....	65,010 45	62,160 69	8,728 46	135,899 60

E. and O. E.

THOMAS WILLIAMS,  
*Accountant*

CHARLOTTETOWN, P.E.I.,  
30th June, 1878.

## No. 11.—PRINCE EDWARD ISLAND RAILWAY.

STATEMENT of General Store Account, Year ended 30th June, 1878.

		\$	cts.	\$	cts.
1877.					
June 30.....	To Balance.....			48,613	
1878.					
June 30.....	To Purchases during the year, including rails.....	69,773	17		
	Charges from other Departments.....	4,244	46		
	Pay rolls.....	3,460	17		
				77,477	80
1878.	Cr.			126,091	23
June 30.....	By Issues during the year.....			74,245	66
	Balance { Ordinary stores..... \$31,301 12 }				
	Fuel ..... 2,455 06 }				
	Rails and fastenings on hand..... 18,089 39 }			\$51,845	57

E. and O. E.

THOMAS WILLIAMS,  
*Accountant.*

CHARLOTTETOWN, P.E.I.,  
30th June, 1878.

## No. 12.—PRINCE EDWARD ISLAND RAILWAY.

DR.

GENERAL BALANCE.

CR.

	\$	cts.		\$	cts.
General Stores.....	51,845	57	Dominion Account.....	57,562	59
Cash.....	657	08	Accident Insurance.....	313	62
Stations.....	91	17			
Post Office Department.....	2,111	00			
Steamship "Northern Light".....	2,538	11			
Suspense Account.....	635	28			
Total .....	57,876	21	Total .....	57,876	21

E. and O. E.

THOS. WILLIAMS,  
*Accountant.*

CHARLOTTETOWN, P.E.I.,  
30th June, 1878.

## No. 13.—PRINCE EDWARD ISLAND RAILWAY.

COMPARATIVE Statement of Averages, for the Year ended 30th June, 1878.

DETAILS.	1878.	1877.
Train mileage .....	267,233	243,494
Car mileage .....	994,511	897,507
Receipts, per train mile .... Cents	50.85	53.66
do per mile of railway..... \$	693 36	666 66
Percentage of passenger earnings to gross receipts .....	47.84	46.19
do freight do .....	45.74	48.38
do other do .....	6.42	5.43
Expenses per train mile—		
Drivers', firemen's and cleaners' wages .....	4 65	4.96
Fuel.....	5.06	4.78
Oil, tallow, waste and small stores .....	.91	1.09
Repairs to engines.....	5.16	7.20
Water and tank repairs.....	2 00	3 16
Miscellaneous .....	.60	.76
Total .....	18.38	21.95
Mechanical Superintendent's salary, Clerks, office and travelling expenses ..	.96	1.03
	19.34	22.98
Locomotive power.....	19.34	22.98
Car expenses .....	11.01	15.50
Maintenance, way and works.....	23.55	29.77
Station expenses .....	8.86	9.35
General charges .....	6.02	8.14
Total (except renewals) .....	68.78	85.74
Renewals of permanent way and cars.....	14.14	8.14
Total per train mile .....	82.92	93.88
Ordinary working expenses per mile of railway.....	937 79	1,073 11
Renewals of permanent way and cars per mile of railway .....	192 82	93 19
Total .....	1,130 61	1,166 30

E. and O. E.

THOS. WILLIAMS,  
*Accountant.*CHARLOTTETOWN, P.E.I.,  
30th June, 1878.

## PRINCE EDWARD

## MECHANICAL

## No. 1.—STATEMENT of the performance and cost of

No. of Engine.	Builders.	In shop the whole of	Hours in steam.	Train Mileage.				Miles run by Engine.				
				Passenger.	Freight and mixed.	Ballasting.	Piloting.	With train.	Light.	Shunting.	Total.	
1	Hunslet Engine Co'y., Leeds, Eng.	July to Nov., April to June	472				2,930	2,930	22	167	3,119	
2		July to Nov....	1,315	6,482	116		2,302	8,900	251	431	9,582	
3				1,940	11,008	48		2,204	13,260	44	3,682	16,986
4		Nov. to June..	951	10,081	90			10,171	66	460	10,697	
5		July to Nov. April & May..	505	653			2,611	3,264	236	20	3,520	
6	Black, Hawthorn & Co., Gateshead on Tyne	October, February & March	584	5,718			49	5,767	151	248	6,166	
7		Nov., Dec. & March. ....	1,082		4,666		92	4,758	154	2,108	7,020	
8		Aug. to Oct., Feb., & May..	783	170	48	144		362	142	3,595	4,099	
9		Oct. & Nov. March & April	1,412	120	2,253	4,903	1,239	8,515	491	609	9,615	
10				3,054		77	56		133	21	15,160	15,314
11	Baldwin Locomotive Works, Philadelphia	May .....	2,561	351	24,524			24,875	367	1,136	26,392	
12			3,603	126	21,031		354	21,511	378	3,371	25,560	
13			2,893	2,296	24,774		751	27,821	44	1,657	29,522	
14			2,696	7,257	13,443		141	20,841	3	3,216	24,060	
15			2,947	486	12,913	6,997	162	20,557	449	2,059	23,065	
16	Canadian Engine & Machinery Co'y., Kingston, Ont.		3,528	332	26,757		171	27,260	40	2,026	29,325	
17			2,800	586	19,476			20,062	52	2,654	22,768	
18			2,315	536	12,279	4,798		17,604	391	1,559	19,554	
Total.....			35,541	46,202	162,494	16,889	13,006	238,591	3,722	14,151	286,064	

## ISLAND RAILWAY.

## DEPARTMENT.

Locomotives, for the Year ended 30th June, 1878.

Total Mileage of		* Average of cars per mile run with train.	Cost of					Averages per 100 miles run by Engines.				
Cars.	Snow Ploughs.		Enginen's Wages.	Fuel.	Oil, Tallow, Waste.	Repairs.	Total.	Enginen.	Fuel.	Oil, Tallow &c.	Repairs.	Total.
			\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	cts.	cts.	cts.	cts.	cts.
.....	3,119	.....	256 70	192 00	39 35	274 73	762 78	8-23	6-16	1-26	8 80	24-45
11,656	3,039	1-76	526 15	287 68	76 87	997 63	1,888 33	5-49	3-00	0-80	10-41	19-70
30,774	2,214	2-78	747 45	605 76	112 96	299 31	1,765 48	4-40	3-57	0-66	1-76	10-39
21,938	.....	2-15	488 05	460 64	95 18	655 26	1,699 13	4-56	4-31	0-89	6-12	15 88
1,317	3,052	2-01	221 02	125 76	32 44	329 24	708 46	6-27	3-57	0-92	9-36	20-12
12,915	.....	2-26	264 81	246 24	60 98	635 03	1,207 06	4-29	3-99	0-99	10-29	19-56
16,583	.....	3-55	373 76	303 52	56 37	262 51	996 16	5-32	4-32	0-80	3-73	14-17
1,340	.....	3-70	243 78	99 36	20 51	186 38	550 03	5-95	2-42	0-50	4-54	13-41
35,630	1,336	4-89	495 55	569 12	105 00	1,085 38	2,255 05	5-16	5-92	1-09	11-28	23-45
602	.....	4-53	933 83	393 44	104 69	186 47	1,618 43	6-10	2-56	0-68	1-22	10-56
142,357	.....	5-72	1,027 91	1,595 52	258 55	1,032 09	3,914 07	3-89	6-04	0-99	3 91	14-83
94,251	.....	4-45	1,219 79	1,128 64	271 58	1,269 09	3,889 10	4-82	4-46	1-08	5-03	15-39
146,887	68	5-42	1,218 63	1,700 48	262 87	835 78	4,017 76	4-12	5-76	0-89	2 83	13-60
107,475	141	5-19	1,084 71	1,456 00	196 59	823 70	3,561 00	4-50	6-05	0-82	3-13	14-80
131,451	.....	6-44	885 46	1,581 92	230 18	1,243 80	3,941 36	3-84	6-86	0-99	5 39	17-08
135,486	.....	5-00	1,277 54	1,696 16	274 37	1,102 62	4,350 69	4-36	5-78	0-93	3 76	14-83
122,778	.....	6-12	1,057 02	1,062 56	234 69	1,205 58	3,559 85	4-64	4-66	1-04	5 29	15-63
107,396	.....	6-10	812 69	1,182 56	209 08	860 32	3,064 65	4-16	6-05	1-06	4 40	15-67
1,120,836	12,969	4 97	13,134 85	14,687 36	2,642 26	13,284 92	43,749 39	4-59	5-13	0-93	4 64	15-29

\* Deduct piloting from train mileage in making these averages.



**PRINCE EDWARD ISLAND RAILWAY.**  
**MECHANICAL DEPARTMENT.**

No. 2.—STATEMENT of the cost of Locomotive Power for the Year ended 30th June, 1878.

MONTH.	Miles run by Engines, less ballast.	COST OF						AVERAGE PER MILE RUN.							
		Enginemen's Wages.	Fuel.	Oil, Tallow, &c.	Repairs.	Water, including Pump and Tank.	Miscellaneous, including expenses of Office & Engine Houses.	Total.	Enginemen.	Fuel.	Oil, Tallow, &c.	Repairs.	Water.	Miscellaneous.	Total.
		\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.
July.....1877	21,126	993 49	991 13	196 50	989 66	455 20	246 36	3,872 34	4 70	4 70	0 93	4 68	2 16	1 16	18 33
August.....	22,503	1,053 75	1,075 11	214 52	587 22	361 20	242 49	3,534 29	4 98	4 78	0 96	2 61	1 60	1 07	15 70
September.....	21,253	937 49	887 14	185 91	691 08	436 60	252 73	3,390 95	4 41	4 17	0 87	3 25	2 06	1 19	15 95
October.....	21,791	952 18	1,061 76	195 53	1,088 27	570 47	277 94	4,146 15	4 37	4 88	0 90	4 99	2 61	1 27	19 02
November.....	21,390	937 04	1,269 50	213 44	965 32	548 26	389 87	4,253 43	4 33	5 65	1 00	4 51	2 56	1 83	19 88
December.....	22,767	1,102 59	1,255 48	236 86	1,489 50	435 23	447 29	4,966 95	4 84	5 51	1 04	6 55	1 91	1 96	21 81
January .....1878	24,413	1,251 22	1,446 16	246 24	1,139 93	441 83	672 34	5,197 72	5 12	5 92	1 00	4 67	1 80	2 75	21 26
February.....	20,305	1,043 45	1,151 28	198 49	1,085 19	434 27	394 76	4,307 44	5 13	5 67	0 98	5 35	2 14	1 94	21 21
March.....	18,795	1,048 25	1,044 16	170 72	1,417 82	598 57	412 01	4,601 53	5 58	5 56	0 91	7 54	2 70	2 19	24 48
April.....	18,307	866 55	886 72	161 99	1,864 04	387 70	299 63	4,466 63	4 73	4 84	0 88	10 19	2 12	1 63	24 39
May.....	28,741	1,207 18	1,476 56	223 14	1,345 47	336 70	257 27	4,846 32	4 20	5 14	0 77	4 68	1 17	0 89	16 86
June.....	25,812	1,049 28	1,032 85	190 20	1,116 44	432 41	272 96	4,094 14	4 07	4 00	0 74	4 32	1 68	1 05	15 86
Total.....	267,233	12,432 47	13,517 85	2,433 54	13,779 94	5,318 44	4,165 65	51,677 89	4 65	5 06	0 91	5 16	2 00	1 53	19 33

PRINCE EDWARD ISLAND RAILWAY.  
MECHANICAL DEPARTMENT.

No. 3.—MONTHLY ABSTRACT from Locomotive Returns for the Year ended 30th June, 1878.

Months.	Hours in Steam.	Mileage.			Consumption.				Average Mileage.		Consumption per 100 miles run by Engines.			
		Loco-motives.	Cars.	Snow Plows.	Bushels of Coal.	Pints of Oil.	Pounds of Tallow.	Pounds of Waste.	Miles Run to One Hour in Steam.	Of Cars to one of Engine.	Bushels of Coal.	Pints of Oil.	Pounds of Tallow.	Pounds of Waste.
1877—July .....	3,377	26,731	125,300	.....	7,959	1,104	613	450	7.90	4.68	29.77	4.13	2.29	1.68
August .....	3,470	27,631	133,588	.....	8,406	1,176	662	428	7.96	4.83	30.42	4.25	2.39	1.64
September .....	3,221	25,598	111,511	.....	7,306	1,144	565	338	7.94	4.35	28.55	4.47	2.20	1.32
October .....	2,857	22,870	98,461	.....	7,088	912	516	352	8.00	4.30	30.99	3.99	2.26	1.53
November .....	2,884	22,493	102,088	.....	8,091	1,005	608	330	7.80	4.54	35.97	4.46	2.70	1.47
December .....	3,089	22,767	73,198	2,346	7,957	1,108	613	349	7.37	3.21	34.95	4.86	2.69	1.63
1878—January .....	3,291	24,443	75,166	4,479	9,063	1,208	629	316	7.43	3.07	37.08	4.94	2.57	1.29
February .....	2,590	20,305	54,059	4,691	7,255	916	565	247	7.84	2.66	35.73	4.66	2.78	1.21
March .....	2,391	18,795	68,212	1,138	6,526	776	470	275	7.85	3.63	34.72	4.13	2.50	1.46
April .....	2,187	18,307	65,861	312	5,563	768	399	280	8.37	3.60	30.38	4.19	2.18	1.53
May .....	3,292	30,112	121,867	.....	9,512	1,104	598	364	9.15	4.04	31.59	3.66	1.98	1.20
June .....	2,889	26,022	91,535	.....	7,070	972	570	308	9.00	3.51	27.16	3.73	2.19	1.18
Totals .....	35,541	286,064	1,120,836	12,969	91,796	12,223	6,808	4,037	8.05	3.92	32.08	4.27	2.38	1.41

## No. 4.—PRINCE EDWARD ISLAND RAILWAY.

## MECHANICAL DEPARTMENT.

## MONTHLY STATEMENT of Car Mileage for the Year ended 30th June, 1878.

Months.	First Class.	Second Class.	Postal, Baggage and Express.	Box, Stock and Hay.	Platform and Coal.	Total.
1877—July .....	21,732	19,124	6,790	29,425	48,229	125,300
August .....	24,791	22,929	4,997	31,328	49,543	133,588
September .....	18,960	17,740	5,311	34,292	35,208	111,511
October .....	16,877	16,736	4,694	40,637	19,517	98,461
November .....	16,853	19,127	3,144	51,793	11,171	102,088
December .....	14,986	16,539	2,759	33,776	5,138	73,198
1878—January .....	15,243	15,342	1,990	34,644	7,937	75,156
February .....	12,313	11,867	1,334	18,572	9,973	54,059
March .....	14,214	13,883	2,996	19,453	17,666	68,212
April .....	14,551	14,696	3,626	20,504	12,484	65,861
May .....	25,102	28,049	2,646	43,930	22,140	121,867
June .....	22,690	23,091	2,784	29,407	13,563	91,535
Totals .....	218,312	219,123	43,071	387,761	252,569	1,120,836
Less Ballasting .....	272	12,609	3,281	150	110,013	126,325
Balance .....	218,040	206,514	39,790	387,611	142,556	994,511

## No. 5.—PRINCE EDWARD ISLAND RAILWAY.

## MECHANICAL DEPARTMENT.

STATEMENT showing the Number of Locomotives and various classes of Cars on hand 1st July, 1877 and 1878.

Particulars.	Locomotives.	Classification.					
		1st Class.	2nd Class.	Postal, Baggage & Express.	Box and Stock.	Platform.	Vans.
On hand, 1st July, 1877.....	18	14	9	5	150	100	4
Increase during year.....							
Total, 1st July, 1878 .....	18	14	9	5	150	100	4

## PRINCE EDWARD ISLAND RAILWAY.

COMPARATIVE STATEMENT of Maintenance of way Expenditure for Years ending 1875-6, 1876-7, 1877-8.

	1875-6.	1876-7.	1877-8.
	\$ cts.	\$ cts.	\$ cts.
Repairs of track .....	40,002 72	36,282 79	30,663 20
Ballasting.....	51 20	331 94	4,456 16
Rails .....	796 43	1,996 20	1,588 73
Fish Plates.....	592 50	941 63	708 70
Bolts and Nuts.....	215 88	162 16	165 87
Chairs.....	121 95	92 94	80 46
Spikes.....	1,801 53	890 10	1,065 37
Sleepers.....		649 77	441 08
Frogs .....	303 16	1,208 41	1,654 00
Switches.....	390 77	923 64	993 03
Signals.....	207 24	169 54	110 39
Bridges (Wood).....	712 01	2,168 06	2,562 24
Culverts and Cattle Guards .....	311 07	1,192 03	883 70
Buildings and Platforms.....	3,343 61	7,141 74	3,709 58
Wharf at Cascumpec.....		56 47	31 35
“ Summerside.....	240 65	202 01	568 77
“ Charlottetown.....	12 79	52 03	110 62
“ Georgetown.....		218 50	143 55
“ Souris.....			
Fencing .....	1,024 53	967 36	1,855 21
Hand cars and Trolleys.....	1,557 54	463 96	571 53
Tools and repairs of.....	1,800 89	1,568 16	793 05
Station yards and road approaches.....	112 56	1,315 73	1,246 36
Snow ploughs and flangers.....	1,669 56	1,319 28	1,033 83
Removing ice and snow.....	19,089 27	7,617 23	2,571 52
Track scales .....	7 29	14 75	8 52
Cranes .....	2 43		
Chock blocks .....	111 45	51 70	6 81
Engineer's office and expenses .....	4,060 95	3,582 30	3,871 06
Switch locks.....	116 35	49 35	22 80
Semaphores.....		67 49	36 51
Turn tables.....		776 47	461 98
Toggles .....		19 50	512 89
	78,956 33	72,493 24	62,928 42

**RETURN of Accidents, &c, Prince Edward Island Railway, for Year ending 30th June, 1878.**

Date.	Place.	Persons injured.	Passenger or Employee.	Particulars.
1877.				
October 30...	Breadalbane.....	Thos. A. Curtmill....	Employee ...	Fell between cars ; injuries fatal ; verdict, " Accidental death."
December 19	Montrose.....	Geo. Hendry..... Thos. Trainor.....	do ... do ...	Arch plug of boiler of engine broke, scalding driver and fireman badly.
1878.				
January 15 ..	St. Peters .....	Jas. McDonald .. ...	do ...	Arm badly jammed whilst coupling.
May 8 .....	North Wiltshire.	Jas. McDonald .....	do ...	Arm broken whilst shunting.

## APPENDIX No. 20.

## INTERCOLONIAL RAILWAY.

## RAILWAY DEPARTMENT,

MONTREAL, 7th October, 1878.

SIR,—I beg now to make my report upon the working of the Intercolonial Railway for the year ended 30th June, 1878.

The mileage worked has remained the same as for the previous year, viz: 714 miles. The Windsor Branch (32 miles long) was maintained and worked, up to the 24th September, 1877, when it was handed over to the Western Counties Railway Company.

The following statements are appended to this report, viz:

- No. 1. Capital account.  
 " 2. Revenue account.  
 " 3. Locomotive power (Abstract No. 1.)  
 " 4. Car Expenses ( " 2.)  
 " 5. Maintenance of way and works ( " 3.)  
 " 6. Station expenses ( " 4.)  
 " 7. General charges ( " 5.)  
 " 8. General stores account.  
 " 9. Comparative statement of averages.  
 " 10. General balance.  
 " 11. Renewals account.

I also enclose copies of reports made by the Engineer, and the Mechanical Superintendent.

## CAPITAL ACCOUNT.

The total outlay on capital account to 30th June, 1878, amounted to the sum of \$36,091,065.85.

The additions during the past year have been as follows, viz:

For the extension unto Halifax.....	\$72,664 07
" deep water terminus at St. John.....	66,453 18
" land at do do .....	33,000 00
" completion of the Intercolonial between River- du-Loup and Truro .....	101,610 62
" completion of the rolling stock.....	125,245 52
" costs incurred in cases before the Supremo Court.....	9,843 35
Total.....	\$408,816 74

The outlay on the Halifax extension is very nearly completed. The new passenger station was opened for traffic on the 8th August, 1877.

Some additions are now being made for the accommodation of the increasing freight traffic.

The deep water wharf at St. John, is steadily progressing and will be available for the shipment of lumber by next spring, but will not be fully completed till the close of next year.

The outlay for the completion of the line between River-du-Loup and Truro, consists of the payments to contractors and the closing up of the accounts for the majority of the works completed during the year.

The whole of the rolling stock now ordered, has been received and paid for.

All works of improvement on the whole line have continued to be charged to working expenses, instead of capital, as is the usual course with Railway Companies. The outlay for these improvements, including ballasting, has exceeded \$100,000 during the year, and to that extent increases the cost of working the traffic.

#### REVENUE ACCOUNT.

The gross earnings for the year amounted to.....	\$1,378,946 78
Against for the previous year....	1,154,445 35

Shewing an increase of..... \$ 224,501 43

This is equal to 19·44 per cent.

The increase in the passenger traffic amounted to \$14,888.67 with an increase of 5,529 in the number carried, as follows :

Total carried in 1877-78.....	618,957
“ 1876-77.....	613,428
Increase.....	5,529

In the freight traffic there was an increase of \$194,139.90.

The tonnage carried in each year was as follows :

	Tons.
In 1877-78 .....	522,710
In 1876-77 .....	421,327
Increase .....	101,383

General business throughout the year has been very much depressed, and this has had an injurious effect upon the traffic of the Railway.

Ship-building has been very much depressed, and so have both the coal and lumber trades.

The traffic in connection with the iron works at Londonderry continues to be satisfactory, and is steadily growing.

The current of traffic from and to the west, with the Lower Provinces, has largely increased during the year.

The Allan steamers landed their cargoes for the upper Provinces last winter at Halifax, and this traffic was promptly forwarded to destination.

The following comparative statement will show the growth of the general traffic :

	1877-78	1876-77	Increase.
Barrels of flour, No.....	637,778	254,710	383,068
Bushels of grain, No.....	331,170	292,852	38,318
Head of live stock.....	46,498	37,414	9,084
			Decrease.
Lumber, in feet.....	56,606,547	58,096,475	1,489,928
			Increase.
All other goods, tons.....	375,025	311,756	63,269

The increase in tonnage carried was 101,383 tons or equal to 24·63 per cent.

The traffic in fish continues to increase.

The mail service has been satisfactorily performed both *via* Halifax in winter, and Rimouski in summer.

The traffic, both passenger and freight, in connection with the ocean steamers, continues steadily to increase.

#### WORKING EXPENSES.

These have amounted to the sum of \$1,611,273.56, as against the sum of \$1,461,673.55 in the previous year, equal to an increase of 10·23 per cent.

The increase in the gross receipts was equal to 19·44 per cent.

The increase in the tonnage carried was equal to 24·63 per cent. And the increase in the mileage of trains was 21·79 per cent.

As already stated the outlay for ballasting and increased facilities in the shape of sidings, station and other buildings, improved water supply, &c., has all been included in the working cost.

This includes the following principal items :

Ballasting.....	\$52,000
Additional sidings.....	20,000
Semaphore signals.....	3,500
Additional station buildings.....	4,500
Increased water supply, fencing, car shops, machinery and sundry works .....	25,000
	<u>\$105,000</u>

These items are usually charged to Capital by Railway Companies, and have therefore to that extent increased the charges for the working of the traffic of this railway during the past year.

The rolling stock has been well maintained, and is now in an efficient condition.

The total number of engines and carriages is now 3,239, against 2,868 last year, and 2,518 in 1875-76.

The cost of maintaining and renewing the larger stock is of necessity greater.

Three engines were procured during the last year to maintain the stock, and their cost included in the working expenses.

Three additional engines are now under construction at Moncton, to be charged against the working expenses of the present year.

A number of cars of various descriptions, are also being built, to maintain the car stock in a thoroughly efficient condition.

The comparative mileage of engines, trains and cars was as follows :

	1876-77	1877-78	Increase.
Engine Mileage.....	2,176,201	2,498,088	322,887
Train do .....	1,773,621	2,160,080	386,459
Car do .....	15,973,420	22,164,816	6,191,396

The increase in the train mileage has been 21·79 per cent., and in car mileage 38·82 per cent., which proves that the engines have hauled greater loads than in the previous year.

The engine mileage shows that each engine has run an average of nearly 24,000 miles during the year, which in a severe climate like that of Canada, is a high average.

The engine stock is now worked to its full capacity, which will tend to increase the cost of repairs.

The stock of cars being sufficient to work the existing traffic, the car hire is now in our favour.



The cost of repairs to engines was very heavy last year, in consequence of the repairs required to the large number of engines used in the previous year for ballasting purposes.

This added upwards of 1c. per mile to the cost of repairs, even on the increased mileage.

The additions to the water service were also heavy, involving an increased cost per mile of 0.33c.

The total cost of running the trains per mile, per train, including the charges usually made to capital account, was as follows for the last two years, viz :

	1876-77	1877-78	Decrease.
Ordinary expenses.....	82.41cts.	74.59cts.	7.82cts.
Renewals .....	11.28 "	9.26 "	2.02 "
Total.....	93.69 "	83.85 "	9.84 "

The ordinary working expenses in 1874 were \$1.02 per train mile, as against 74.59c. last year or a decrease of 26.87 per cent with the heavier trains hauled.

During the last year 156,742 sleepers were put into the track, being an increase of 30,500 over the previous year. The number will increase for the next few years.

A large outlay has been incurred for fencing during the last year. The snow sheds and fences have been increased.

There are now 65 snow sheds of a total length of 12½ miles; and an aggregate length of 46½ miles of snow fencing.

The greater part of the latter has been placed further from the rails, involving in many places the purchase of additional land.

These sheds and fences have reduced the cost of keeping the road open in winter, and greatly benefitted the regularity of the train service.

Considerable outlay has been incurred in renewing culverts, cattle guards, bridge stringers &c.

A large sum has also been expended in improving the drainage upon the older parts of the line.

This important item will be completed during the present working season, when the entire line will be in a very satisfactory condition.

A large proportion of the water service of the line is now supplied by gravitation, and this system is being adopted wherever it is possible to do so.

#### NET RESULTS.

The general comparison during the last two years is as follows :

	1876-77	1877-78	Increase.
Gross traffic. ....	\$1,154,445 35	\$1,378,946 78	\$224,501 43
Ordinary expenses.....	1,461,673 55	1,611,273 56	149,600 01
Loss in working.....	307,228 20	232,326 78	
Or a decrease of.....			\$ 74,901 42

in the loss on working the line.

The gross traffic has therefore increased 19.44 per cent. The working expenses have increased 10.23 per cent, and the loss on the working of the line has decreased 24.40 per cent.

Deducting the sum of \$105,000 included in the working expenses for charges usually made to capital, being for improvements to the property, the cost of working has exceeded the gross receipts, by less than \$130,000 during the last year.

## RENEWALS.

The usual charge of \$200,000 has been made for renewals, being the same amount as was charged in the previous year.

The entire line with the exception of the Shediac Branch, 11 miles, and 13½ miles on the Pictou Branch, is now laid with steel rails.

Heavy repairs have continued to be made to the masonry and bridging on the old parts of the line.

An iron bridge of 150 feet span, supported on substantial stone abutments was completed at Elmsdale during the past year.

Six iron spans varying from 20 to 36 feet were also substituted at various places for decayed wooden structures.

Heavy amounts of masonry work are now in progress at Enfield, Barney Brook, Hall's Creek and other places, to replace defective structures which were no longer safe to carry the increasing traffic. These will be completed by the close of the present working season, when the heavy renewals of the old parts of the line will be completed.

The whole line will then be in first-class order, requiring no large outlays for many years.

A charge for renewals during the current year of about the same amount as has been charged last year will close the renewal account.

It will then be desirable to consider whether a sinking fund should be provided to meet the renewal of the steel rails when they begin to wear out.

## Stores.

The stock of stores during the last two years compares as follows :

	1876-77	1877-78
General stores including fuel.....	118,370 02	135,561 35
Steel and iron rails.....	190,704 68	173,227 82
Old materials for sale.....	39,963 08	36,633 36

In the stock of rails are included 746 tons of new steel rails required for repairs, and 182 tons of broken or scrap steel rails, 3,926 tons of iron rails fit for branches and sidings, and 3,470 tons of old iron rails only fit for sale as scrap.

The steel rails are all required. The useful iron rails are being used for additional sidings and branches, and this quantity will thus probably be reduced to 2,750 tons at the end of the current year.

At least 500 tons will be required yearly hereafter for sidings, so that this stock of useful rails for a line upwards of 700 miles long, is not large.

The scrap rails will gradually disappear by sales to rolling mills.

The old materials for sale are being disposed of as opportunity offers.

The price at present is very low. The prices of all stores purchased have remained low during the last year and have not materially varied from the prices paid in the previous year. The depressed condition of business throughout Canada has materially affected the traffic of the railways.

So far the traffic of the current year shows a small improvement over last year, which is satisfactory considering the heavy decreases which are being exhibited on the principal railways in Canada and the United States.

The increase is entirely in the freight traffic, the passenger business shewing a considerable falling off, as compared with last year.

I have the honor to be, sir,

Your obedient servant,

C. J. BRYDGES,  
General Supt. of Govt. Rys.

F. BRAUN, Esq., Secretary,  
Department of Public Works,  
Ottawa.

## No. 1.—INTERCOLONIAL RAILWAY.

## CAPITAL ACCOUNT.

DR.

CR.

1877. June 30....	To Cost of Road and Equipment.....	\$ cts. .....	\$ cts. .....	\$ cts. 1877. June 30 ...	\$ cts. 1877. June 30 ...	\$ cts. 1877. June 30 ...
1878. June 30....	Outlay on Halifax Extension.....	72,864 07				
	do Deep Water Terminals, St. John....	66,453 18				
	Land paid for, under Arbitration Award, at St. John.....	33,000 00	172,117 25			
	Expenditure on completion of Intercolonial Railway between Rivière du Loup and Truro, Works, permanent way, buildings, right of way, &c.....	101,610 62				
	Rolling stock, postal, baggage, mail and box cars, snow ploughs and flangers .....	125,245 52				
	Supreme Court Cases.....	9,843 35				
			236,699 49	1878. June 30 ....	408,816 74	408,816 74
					36,091,065 85	36,091,065 85

E. &amp; O. E.

MONCTON, N.B., 30th June, 1878

THOMAS FOOT,  
*Accountant.*

# No. 2.—INTERCOLONIAL RAILWAY. REVENUE ACCOUNT for Year ending 30th June, 1878.

[1878]

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Previous Year.	Expenditure.	Year ending 30th June, 1878.	Previous Year.	Receipts.	Year ending 30th June, 1878.
\$ cts.		\$ cts.	\$ cts.		\$ cts.
442,895 28	Locomotive power	537,815 04	460,368 15	Passenger traffic.....	475,358 82
335,470 45	Car expenses	325,366 16	607,564 99	Freight traffic.....	801,704 89
894,280 84	Maintenance way and works	441,114 39	86,512 21	Mails and sundries.....	101,985 07
167,475 85	Station expenses	185,628 54			
138,220 50	General charges	136,153 35	1,154,445 35	Balance—Receipts against working ex- penses.....	1,378,948 78
13,530 65	Car mileage.....	1,626,067 48	307,228 20		232,326 78
	Total ordinary expenditure.....	14,793 92	1,461,673 55		1,611,273 56
1,461,673 55		1,611,273 56			

E. and O. E.

THOMAS FOOT,  
*Accountant.*

MONCTON, N.B., 30th June, 1878.

## No. 3.—INTERCOLONIAL RAILWAY.

## LOCOMOTIVE POWER.—(Abstract No. 1)

Previous Year.		Year ending 30th June, 1878.
\$ cts.		\$ cts.
6,795 39	Mechanical Superintendent's salary, Clerks office and travelling expenses....	7,460 82
97,825 88	Wages, Drivers, Firemen and Cleaners .....	118,503 67
142,510 13	Fuel.....	157,362 96
19,487 00	Oil, tallow, waste and small stores.....	23,424 82
136,940 81	Repairs to engines, tenders and engine tools .....	180,439 02
25,238 31	Water, including pump and tank repairs.....	37,111 68
14,097 74	Miscellaneous.....	13,512 07
442,895 26		537,815 04

E. and O. E.

THOMAS FOOT,  
*Accountant*MONCTON, N.B.,  
30th June, 1878.

## No. 4.—INTERCOLONIAL RAILWAY.

## CAR EXPENSES.—(Abstract No. 2.)

Previous Year.		Year ending 30th June, 1878.
\$ cts.		\$ cts.
97,622 84	Repairs to passenger cars .....	64,950 23
14,956 72	Repairs to postal express and baggage cars.....	19,901 24
80,506 89	Repairs to freight cars and vans.....	89,044 95
86,827 67	Wages of Conductors, Train Baggage Masters and Brakesmen .....	99,878 83
5,211 89	Oil and waste for packing.....	10,785 84
30,623 95	Small stores and fuel .....	26,161 83
9,520 49	Miscellaneous .....	15,643 24
325,270 45		325,356 16

E. and O. E.

THOMAS FOOT,  
*Accountant.*MONCTON, N.B.,  
30th June, 1878.

## No. 5.—INTERCOLONIAL RAILWAY.

## MAINTENANCE OF WAY AND WORKS—(Abstract No. 3).

Previous Year.		Year ending 30th June, 1878.
\$ cts.		\$ cts.
9,333 45	Engineers' salary, clerks, office and travelling expenses .....	10,066 83
249,131 50	Wages in repairing roadway, fences and semaphores, including new sidings laid in .....	275,231 09
8,285 86	Rails and fastenings, including new sidings laid in .....	18,324 35
17,916 01	Sleepers .....	31,066 43
13,384 12	Timber, lumber, &c., for repairs to bridges, cattle guards, crossings, snow sheds, fences, &c. ....	25,435 12
10,139 08	Repairs to wharves ..	3,318 20
28,500 49	do buildings and platforms, including extensions of, and additions to same .....	47,549 27
17,537 22	do snow ploughs, flangers and tools .....	15,328 34
28,771 88	Clearing ice and snow .....	12,659 78
1,281 23	Miscellaneous .....	2,144 98
384,230 84		441,114 39

E. and O. E.

THOMAS FOOT,  
*Accountant.*MONCTON, N.B.,  
30th June, 1878.

## No. 6. INTERCOLONIAL RAILWAY.

## STATION EXPENSES—(Abstract No. 4).

Previous Year.		Year ending 30th June, 1878.
\$ cts.		\$ cts.
116,578 23	Salaries and wages of station masters, agents, clerks, telegraph operators, station baggage masters, yard masters, switchmen, watchmen and labourers .....	141,631 06
40,897 62	Fuel, oil, light, stationery, tickets and other incidental expenses .....	43,997 48
157,475 85	Miscellaneous .....	185,628 54

E. and O. E.

THOMAS FOOT,  
*Accountant.*MONCTON, N.B.,  
30th June, 1878.

**No. 7.—INTERCOLONIAL RAILWAY.  
GENERAL CHARGES.—(Abstract No. 5).**

Previous Year.		Year ending 30th June, 1878.
\$   cts.		\$   cts.
40,292 73	General Superintendent and Superintendent's salaries, his Assistants Train Despatchers, Clerks, &c., Passenger and Baggage Agent, and Assistant General Freight Agent, and office and travelling expenses.....	52,203 62
28,113 29	Accounting Department, salaries of the Accountant, Auditor, Pay- masters and Cashiers, Clerks. Office and Travelling expenses....	31,476 44
8,856 06	Damages to men, animals and goods .....	7,822 75
25,266 22	Ferry service.....	14,496 42
4,247 72	Telegraph expenses (not including pay to operators).....	2,188 62
20,931 89	Miscellaneous, printing, advertising, &c.....	19,702 00
10,512 59	Agency expenses.....	8,263 41
138,220 50		136,153 35

E. and O. E.

**THOMAS FOOT,**  
*Accountant.*

MONCTON, N.B., 30th June, 1878.





## No. 9.—INTERCOLONIAL RAILWAY.

## COMPARATIVE STATEMENT of Averages, Year ending 30th June, 1878.

Details.	1878.	1877.
Mileage of Railway open.....	714	714
Engine mileage.....	2,499,088	2,176,201
Train do.....	2,160,080	1,773,621
Car do.....	22,164,816	15,973,420
Receipts per engine mile.....	Cts. 55.18	Cts. 53.05
do per mile of railway.....	\$1,931.29	\$1,616.87
Percentage of passenger earnings to gross receipts.....	34.47	39.88
do freight do do.....	58.14	52.62
do other do do.....	7.39	7.50
Expenses per engine mile—		
Drivers', Firemen's and Cleaners' wages.....	4.74	4.50
Fuel.....	6.29	6.55
Oil, tallow, waste and small stores.....	0.94	0.89
Repairs to engines.....	7.22	6.29
Water and tank repairs.....	1.49	1.16
Miscellaneous.....	0.54	0.65
Total.....	21.22	20.04
Mechanical Superintendent's salary, office and travelling expenses.....	0.30	0.31
	21.52	20.35
Locomotive power per engine mile.....	21.52	20.35
Car expenses do.....	13.02	14.95
Maintenance way and works, per engine mile.....	17.65	17.66
Station expenses do.....	7.43	7.24
General charges do.....	5.45	6.35
	65.07	
Car mileage.....	6.59	0.62
Total (except renewals).....	64.48	67.17
Renewals.....	8.00	9.19
Total per engine mile.....	72.48	76.36
Locomotive power per train mile.....	24.90	24.97
Car expenses do.....	15.06	18.34
Maintenance way and works, per train mile.....	20.42	21.67
Station expenses do.....	8.60	8.88
General charges do.....	6.30	7.79
	75.28	
Car mileage.....	6.69	0.76
Total (except renewals).....	74.59	82.41
Renewals.....	9.26	11.28
Total per train mile.....	83.85	93.69
Ordinary working expenses per mile of railway.....	\$2,256.69	\$2,047.16
Renewals per mile of railway.....	280.11	280.11
Total.....	\$2,536.80	\$2,327.27

E. and O. E.

THOS. FOOT,  
Accountant.MONCTON, N.B.,  
30th June, 1878.

## No. 10.—INTERCOLONIAL RAILWAY.

## GENERAL BALANCE.

	\$	cts.	\$	cts.	By	\$	cts.
Cash.....			12,418	34	Dominion Account.....	685,060	28
General Stores :—					Accident Insurance.....	7,481	06
Ordinary Stores.....	135,561	35			Steamer "Northern Light".....	2,116	55
Old Rails.....	173,227	82			Grand Trunk Railway, General Account.....	331	73
Old Material.....	36,633	36			Chatham Branch Railway.....	199	71
					Unpaid Account.....	18,156	13
Stations.....			345,423	53			
Windsor and Annapolis Railway.....			42,519	77			
do Punchard, Clarke & Co.....							
Spring Hill and Parrboro' Railway.....			16,352	44			
Prince Edward Island Railway.....			1,347	65			
St. Martins and Upland Railway.....							
Western Counties Railway.....			3,786	60			
Elgin Branch Railway.....			8,339	75			
Albert Railway.....			673	70			
Grand Trunk Railway, Traffic Account.....			400	97			
Vale Coal Company.....			2,082	09			
Spring Hill Coal Company.....			9,456	47			
Acadia Coal Company.....			3,516	02			
Intercolonial Coal Company.....			4,574	63			
Post Office Department.....			5,423	58			
Intercolonial Express Company.....			21,089	42			
Renewals Suspense.....			2,086	33			
Bills Receivable.....			168,396	03			
Suspense Account.....			7,400	00			
Steel Company of Canada.....			2,137	48			
Dominion Telegraph Company.....			16,979	91			
Pullman Palace Car Company.....			1,244	90			
Goldbrook Mills.....			536	19			
Steamer "Margaretha Stevenson".....			833	43			
Individual Accounts.....			1,446	63			
			6,871	93			
			683,345	46			

E. and O. E.

THOS. FOOT,  
*Accountant.*

MONCTON, N.B., 30th June, 1878.

No. 11.—INTERCOLONIAL RAILWAY.

RENEWALS.—(Abstract No. 6).

Previous Year.		Year ending 30th June, 1878,
\$ cts.		\$ cts.
200,000 00	Rails and Fastenings, Fencing, &c.....	200,000 00

E. and O. E.

THOS. FOOT,  
*Accountant.*

MONCTON, N B.,  
30th June, 1878.

## INTERCOLONIAL RAILWAY.

ENGINEER'S OFFICE,  
MONCTON, N.B., 20th July, 1878.

SIR,—I have the honour to submit my annual report on the operations of the Engineering Department for the year ended 30th June, 1878.

The whole of the iron rail remaining on the old lines between Halifax and St. John at the beginning of the year was replaced with steel rail, against which work the sum of \$200,000 has been charged to renewal account, leaving an amount of about the same sum to be charged during the current year, when the whole of the renewals of the old lines will have been charged to revenue.

On the 24th September 1877 the Department ceased to maintain the Windsor Branch, it having been handed over to the Western Counties Railway Company in accordance with previous legislation.

156,742 sleepers were put in track on the main line and branches, to replace those worn out, as against 126,242 renewed the previous year.

Trains were employed in hauling gravel from pits near Truro, Dorchester and Salisbury, to ballast various points between Halifax and St. John, the outlay on this service being \$52,429.50.

16,245 rods of post and board and pole fence, were built at a cost of \$11,618.88, and \$14,446.79 were expended in the repairs of old fencing and in replacing farm gates.

8,395 feet of snow fence were built in the Metapedia Valley between Casapscal and Tartague, and 1,300 feet on the St. Lawrence district between St. Octave and Ste. Flavie.

The severe and continuous storms which prevail in winter along the St. Lawrence rendered it necessary to move the snow fence farther from the track. Arrangements were made with the land owners to admit of this being done, and the whole of the fence from Riv. du Loup to Trois Pistoles has been placed where it will be most serviceable in preventing heavy drifts.

The snow shed at St. Octave cutting was lengthened 800 feet; a new shed 1,650 feet long was built two miles south of Ste. Flavie, and heavy repairs were made to the sheds near Rimouski bridge and a short distance south of Tartague, to make good the damage sustained from the slopes of the cutting falling in.

There are now 65 snow sheds erected throughout the line, of an aggregate length of 12 miles, while the total length of snow fence amounts to 46½ miles.

The cost of keeping the road clear of snow and ice during the past winter amounted to \$12,659.78 as against \$28,771.88 for the previous year. The expenditure in acquiring snow ploughs and flangers was \$6,738.88, there being 28 of the former and 12 of the latter.

The iron lattice bridge, of 150 feet span at Elmsdale referred to in my report of last year, as under construction, was opened for traffic on the 26th July 1877. The bridge was covered with locomotives its entire length, when the test was made. Four locomotives were also coupled and were run over the bridge at a speed of nearly 40 miles an hour, with a result satisfactory in every respect. The bridge was built by the Starr Manufacturing Co. of Dartmouth, N.S., and the workmanship reflects credit on the makers.

Four wooden spans of 20 feet each, over the Rawdon River, near Wellington, have been replaced with iron plate girders, and the masonry has been partially renewed.

Plate girders of the respective lengths of 30 feet and 36 feet are now on the ground, and will shortly replace timber spans at Torryburn and Rothsay.

The abutments and piers of the iron bridge at Bedford, as well as the stone retaining walls received necessary repairs.

Between Bedford and Halifax, four stone culverts were repaired.

The foundations of a 12 feet arch culvert, intended to replace three timber spans of 30 feet each over Barney Brook, near Milford, are taken out and some of the masonry is laid.

Work has also been commenced upon the foundations for an iron lattice bridge of 110 feet span, to replace the three spans of 50 feet each, near Enfield. The masonry in both these bridges is most defective.

Two beam culverts of stone were rebuilt near Milford and Brookfield, and two box culverts were renewed near Stewiacke.

A short distance south of Greenville, a box culvert, in size 3 x 6 feet, gave way under a bank 25 feet high, owing to the stone being of an inferior character. The length of the culvert is 66 feet, and steps are being taken to rebuild it. I have made enquiry and am informed that there is but one other culvert built from the same quarry.

A 4 x 2½ feet stone culvert was rebuilt under a bank 30 feet high near Milford, and another of the same size has been commenced within a short distance, under a bank of almost equal height. These culverts could not be delayed another season, as the banks were in danger of being washed away, owing to the old structures being unable to vent the water after heavy rains.

Between Moncton and St. John, necessary repairs were made to a few stone culverts.

When the road was built, a stream diversion was made between St. Fabien and Bic stations, but a heavy freshet undermined and carried away the railway bank, which necessitated the construction of a 4 x 2½ feet culvert of stone, to protect the road bed.

The renewal of the timber bridge over Hall's Creek, near Moncton, with masonry and iron, was begun last month. It is intended to transfer one of the 50 foot spans now in Enfield bridge to this work.

Five timber cattle guards were built between Halifax and Truro, and seven between Truro and Amherst, and a large number of small bridges, cattle guards and open culverts, between Halifax and St. John, were supplied with new stringers.

The timber floor beams and stringers of the iron bridge over the Tantramar river near Sackville, were renewed with Southern pine and will prove durable.

The timber overhead bridge in the first snow shed north of Newcastle was raised four feet to admit of a man standing on a box car when passing under it, and other bridges of this class received repairs.

On the 8th of August, 1877, the new passenger station at Halifax was opened for traffic. A brick shed with gravelled roof, for the storage of coal and oil, has been built at the north west corner of the passenger shed.

At Richmond a freight shed 188 feet long and 34 feet wide, was built on the deep water wharf for the reception of bonded goods. This building with the one previously erected, affords large accommodation for the ocean steamers.

A quantity of stone ballast has been deposited on the seaward side of the above wharf, to bind the cribs together, and to strengthen the work.

A beginning has been made with the foundations of a brick building at Richmond for the stores department. The length will be 80 feet and the width 32 feet.

It is intended to heat this building as well as the present oil shed and frame car shed with steam supplied from a new boiler to be placed in the machine shops.

At Four Mile House, the passenger platform was rebuilt.

At Bedford, the agents' dwelling and the station platform were repaired, and at Moir & Co.'s Mills, near this station, two sidings were laid, of a total length of 650 feet.

A track 322 feet long was laid on a trestle work built by the Halifax Rolling Mill Company at Three Mile House.

A mile north of Wellington, a siding 1,300 feet long was laid to a tannery owned by Col. Laurie, he having graded the road bed and furnished the sleepers.

At Enfield station, the office was enlarged, and other slight improvements were made.

'The siding at Smith & Kayes' brickyard, near Elmsdale, was lengthened 288 feet, and was converted into a "through" siding.

The station buildings at Elmsdale were enlarged and improved and the platform was lengthened 100 feet.

At Shubenacadie, the road approaches to the station were graded and gravelled, and a platform for loading heavy timber was begun.

The small flag station at Polly Bog in size 16x24 feet, was completed, and slight repairs were made to the freight shed at Stewiacke.

Between Polly Bog and Stewiacke a siding 3380 feet long was put down for the convenience of Graham Brothers, who are working a limestone quarry. The whole of the grading was done by the firm, and the track was laid at their expense.

At Johnston's Crossing the platform was rebuilt.

The exterior of Truro station building received two coats of paint, and a portion of the roof was reshingled. Four apartments were also made over the dining saloon for the use of the proprietor of the restaurant. The passenger platform at this station was rebuilt, the floor of the engine shed was repaired, new gearing for the turntable was provided, and an addition of 30 feet was made to the frame car shed, for the storage of track material.

Three new sidings were also laid, and six were lengthened, which increased the yard accommodation 2,470 feet.

At Union, the platform was rebuilt, and West River station building was repaired.

A platform for shipping heavy timber was built at Hopewell.

At Stellarton, the roof of the engine shed was reshingled and a siding 275 feet long was laid at Cameron's brickyard, adjoining the station, on a road bed prepared by the owner.

The pile foundation which supports the freight shed at Pictou Landing became unsafe from the action of the seaworm on the timber, and a crib 110 feet long and 32 feet wide was built to carry the trains.

At Londonderry the siding accommodation was increased 2,000 feet.

A frame station house 29x21 feet and a platform 150 feet long and 12 feet wide were built at Greenville Crossing, and the siding was lengthened 560 feet.

A "blind" siding 420 feet long, was laid at Smith's Brook, near Wentworth, for the timber traffic.

At Oxford a freight shed was built, the size being 50x23 feet, the station platform was extended 30 feet, and 320 feet were added to the through siding.

1,250 feet of four inch iron pipe were laid at Amherst to complete the gravitation water supply at this station, and in substitution of the 1½ inch pipe originally laid.

The passenger platform at Sackville was lowered, and the station buildings received slight repairs.

A siding 900 feet long was laid at Bennett's steam saw mill, near Maccan—he having graded the roadway and supplied the sleepers.

Evan's siding between Sackville and Dorchester was lengthened 490 feet, and was made a through siding.

Three sidings in Spring Hill yard were graded and extended a total length of 1,566 feet to afford greater accommodation to the coal traffic.

The station buildings and platform at Dorchester were lowered nearly three feet, for the convenience of the public, and a new siding 442 feet long was laid down.

Memramcook Station was repaired and painted, and two of the sidings were lengthened 530 feet each.

The exterior of Moncton Station buildings was painted, and improvements were made in some of the offices.

A new passenger station, in size 22 x 30 feet, and a platform 10 feet wide and 200 feet long were built at Riverside.

A siding 513 feet long was laid at Carleton, and the old one was extended 164 feet.

At Acadieville siding, near Carleton, a freight shed, 50 feet long and 25 feet wide, was built out of the temporary passenger station at Halifax; and at Newcastle the old engine house was removed from the wharf, and erected in the station yard for the storage of snow ploughs on that division.

Near Nash's Creek 5 miles north of Jacquet River, a siding 414 feet long and a platform 50 feet long were laid.

On the 27th October, 1877, the whole of the station buildings at Assametquaghan were accidentally destroyed by fire; and were immediately rebuilt.

The size of the new station is 40 feet x 21 feet, the coal shed 80 feet x 20 feet, and the tank house 20 feet x 22 feet.

At Sandy Bay Road  $3\frac{1}{2}$  miles north of Sayabec, a platform 60 feet long was built, and a road, nearly a mile long, was formed to connect Sayabec Station with the main post road.

At Amqui the wood shed was converted into a freight shed.

A siding 276 feet long and a platform 200 feet x 12 feet were laid at Moffat's Mills near Campbellton, and at Flatlands a siding 300 feet long, together with a platform, were provided.

A double dwelling was built at the south end of Bic Mountain, for the use of the trackmen, that a close watch might be kept upon this part of the road, in case of rocks falling upon the track. The occupants are charged rent.

A shed 200 feet long was built at Ste. Flavie for the storage of snow ploughs during the summer months.

At St. Octave an extension of 20 feet is being made to the station building to afford increased accommodation; and at Metis road a flag station and platform are in course of erection.

In addition to the foregoing buildings a large number have received necessary repairs of various kinds, some of them involving a heavy outlay.

The total expenditure in the erection of new buildings and repairing old ones during the year amounted to \$47,549.27 as against \$28,500.49 for the previous year.

The additions to sidings throughout the line increased their length by 17,590 feet, the total number now being 458 with an aggregate length of  $85\frac{1}{2}$  miles.

Seventeen stations were furnished with distant semaphore signals, making 63 supplied to the end of June, 1878, out of a total of 90 booking stations on the line.

These signals will continue to be erected until all regular stations are supplied.

At Weldford a steam pump was furnished for the water supply and an additional tank was built and connected with the old one.

6,000 feet of 6 inch iron pipe are being laid at Newcastle to replace clay pipe originally laid. The supply is fed by gravitation, and is a bountiful one.

At Bartibogue a steam pump known as the "Rider Compression Engine" was provided for the water supply, and has proved most economical in the use of fuel.

1760 feet of four inch iron pipe were laid to provide an efficient gravitation supply at Casaupscal and repairs were made to the reservoirs at Cedar Hall, Assametquaghan and Mill Stream.

The line throughout is in good running order, and on the completion this season, of the unfinished portions of ballasting between Spring Hill and Painsec, comprising about 20 miles, the track will not be surpassed by that of any railway on this continent.

I have the honor to be, Sir,

Your obedient servant,

A. MACNAB,

*Engineer.*

G. J. BRYDGES, Esq.,

General Superintendent of  
Government Railways.

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**INTERCOLONIAL RAILWAY.**

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**MECHANICAL SUPERINTENDENT'S OFFICE,****MONCTON, N.B., 27th August, 1878.**

SIR,—I beg to submit for your information the following statements, showing the operations of the Mechanical Department, for the fiscal year ending 30th June, 1878:—

- A. Statement showing the number of locomotives and the various classes of cars, and the condition in which they are at present.
- B. Statement showing the locomotive and car mileage, with the averages of passenger and freight cars hauled per mile.
- C. Abstract of locomotive returns.
- D. Comparative statement of the cost of locomotive power for each month during the year.
- E. General statement of the expenses of the Mechanical Department.

A fence enclosing the yard at Moncton, a new time office, boilers for car shop, and an addition thereto; a car shop at St. John; large addition to water supply along the line; a new mail car and three new engines, costing in all \$55,938.46, were provided at cost of Revenue.

The rolling stock generally is in good condition.

I am, Sir,

Your obedient servant,

**H. A. WHITNEY,**

*Mechanical Superintendent.*

**C. J. BRYDGES, Esq.,**

General Superintendent Government Railways,  
Montreal.



**A.—STATEMENT showing the Number of Locomotives and the various Classes of Cars on the 1st July, 1877, and 30th June, 1878.**

Particulars.	Locomotives.	The Various Classes of Cars.										
		First Class.	Second Class	Postal and Smoking.	Express and Baggage.	Conductor's Vans.	Box Freight.	Stock.	Hay.	Platform.	Hoppers.	Total.
On hand, 1st July, 1877, serviceable..	102	45	34	17	13	15	728	46	33	1,021	897	2,849
do do condemned.....	.....	1	.....	.....	.....	1	6	.....	1	7	3	19
Total Stock, 1st July, 1877....	102	46	34	17	13	16	734	46	34	1,028	900	2,868
Purchased to maintain Stock and paid out of Running Expenses.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Built at Moncton, as increase of Stock charged to Capital .....	.....	.....	.....	4	.....	18	246	20	.....	.....	.....	288
Built by James Crossen at cost of Capital .....	.....	.....	.....	.....	.....	.....	82	.....	.....	.....	.....	82
Built at Moncton and charged to Car Expenses.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1
Changed from Postal to Express during the year.....	105	46	34	22	13	34	1,062	66	34	1,028	900	3,239
.....	.....	.....	.....	5	5	.....	.....	.....	.....	.....	.....	.....
Changed from Express and added to Vans .....	105	46	34	17	18	34	1,062	66	34	1,028	900	3,239
.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....
Total Stock on hand, 1st July, 1878.....	105	46	34	17	17	35	1,062	66	34	1,028	900	3,239

# B.—INTERCOLONIAL RAILWAY.

STATEMENT of Locomotive and Car Mileage for the Year ending 30th June, 1878.

Months.	Locomotive Mileage.		Car Mileage.							Average No. of Cars per Mile.	
	Passenger.	Freight.	1st Class.	2nd Class.	Express, Postal and Baggage.	Box Stock and Hay.	Platform.	Hoppers.	Total.	Passenger.	Freight.
1877—July.....	64,634	90,607	152,687	150,487	87,451	1,019,859	210,711	97,362	1,718,357	6·01	14·67
August.....	69,825	100,745	176,053	169,644	96,345	931,966	311,903	176,054	1,861,965	6·33	14·10
September.....	61,650	97,719	177,999	181,341	93,878	926,643	315,173	178,185	1,853,219	6·69	14·53
October.....	69,073	110,500	161,688	167,296	106,794	1,176,214	300,140	183,987	2,095,119	6·30	15·01
November.....	67,926	111,550	146,962	161,897	100,637	1,296,296	250,917	164,904	2,124,633	6·08	15·35
December.....	65,727	111,759	139,936	93,801	93,169	1,099,916	233,166	236,421	1,896,308	4·97	14·04
1878—January.....	63,878	112,536	125,320	82,353	88,868	994,370	174,742	221,824	1,687,977	4·66	12·36
February.....	55,217	97,818	110,317	72,926	78,814	872,124	199,609	144,359	1,478,179	4·74	12·43
March.....	58,790	111,180	117,633	83,050	87,153	1,032,106	184,498	202,650	1,707,090	5·08	12·80
April.....	58,877	112,138	125,062	83,100	92,427	1,137,722	182,952	192,418	1,813,691	5·10	13·50
May.....	65,114	114,563	146,243	100,275	95,124	1,202,796	217,855	265,606	2,079,898	5·28	14·72
June.....	60,613	104,711	144,688	94,934	92,550	1,085,135	305,521	175,662	1,898,390	5·48	14·96
Total.....	764,324	1,275,726	1,726,888	1,424,104	1,113,269	12,774,946	2,887,187	2,238,432	22,164,816	5·58	14·03

**C.—INTERCOLONIAL RAILWAY.**  
**ABSTRACT of Locomotive Returns—June 30th, 1878.**

Months.	Mileages.		Consumption.						Averages.	* Consumption per 100 Miles.			
	Hours in Steam,	Locomoti- tive Mileage.	Tons of Coal.	Pints of Oil.	Lbs. of Tallow.	Lbs. of Waste.	Miles to hour in Steam.	Lbs. of Coal.		Pints of Oil.	Lbs. of Tallow.	Lbs. of Waste.	
1877.													
July .....	19,772	196,113	4,528	10,068	7,188	3,373½	9.91	6.637	5.13	3.66	1.72		
August .....	21,493	211,303	4,994	10,295	7,516	3,707	9.83	5.294	4.87	3.56	1.76		
September.....	20,082	199,663	4,701	8,913	6,780½	3,342	9.94	5.274	4.48	3.39	1.67		
October .....	21,961	222,417	5,520	9,173	7,324	3,524½	10.13	5.559	4.12	3.20	1.58		
November.....	22,123	223,248	5,771	9,593	7,238½	3,635	10.09	5.745	4.29	3.24	1.63		
December .....	22,659	224,322	6,084	9,891	7,218½	3,807½	9.80	6.075	4.41	3.22	1.69		
1878.													
January .....	24,287	225,233	6,560	10,470	6,933	3,495	9.27	6.515	4.65	3.08	1.55		
February .....	20,127	189,468	5,192	8,818	5,870	3,354½	9.41	6.138	4.65	3.09	1.77		
March.....	21,355	208,620	5,084	8,056	5,927	3,356	9.77	5.458	3.86	2.84	1.61		
April.....	21,120	209,441	4,931	7,104	5,517½	3,101	9.91	5.293	3.39	2.63	1.48		
May .....	21,909	222,312	5,027	8,089	6,589	3,464	10.14	5.065	3.64	2.96	1.56		
June .....	20,090	202,647	4,760	7,428	5,929	3,308	10.08	5.245	3.66	2.92	1.63		
Total .....	256,978	2,534,787	63,162	107,928	80,031	41,467	9.86	5.681	4.26	3.15	1.63		

D.—COMPARATIVE STATEMENT of cost of Locomotive Power for each month from 1st July, 1877, to 30th June, 1878.

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Months.	Miles run by Engines.	Drivers' and Firemen's Wages.		Fuel.	Oil, Tallow, Waste and Small Stores.		Repairs to Engines, Tenders and Tools.		Water, including Tank repairs.		Miscellaneous, including Engine House and Office Expenses.		Total.	Cost per 100 miles run by Engines.															
		\$	cts.		\$	cts.	\$	cts.	\$	cts.	\$	cts.		\$	cts.	Fuel.	Oil, Tallow and Waste.	Repairs.	Water.	Miscellaneous.	Total.								
July, 1877.....	196,113	9,483	13	10,901	76	1,761	75	16,805	70	3,338	43	1,561	21	43,830	98	4	83	5	56	0	89	8	55	1	70	0	78	23	31
August.....	211,303	9,680	16	11,690	18	1,937	02	17,711	33	2,221	18	1,268	18	44,526	05	4	58	5	53	0	93	8	38	1	05	0	60	21	07
September.....	199,663	9,559	70	10,806	40	1,651	64	15,985	06	5,507	61	1,511	85	45,052	36	4	80	5	41	0	83	8	00	2	75	6	77	22	56
October.....	222,417	9,633	33	11,037	42	1,855	95	19,245	69	3,431	78	1,843	64	50,047	81	4	33	6	31	0	83	8	63	1	55	0	83	22	59
November.....	223,248	9,932	59	14,512	72	1,956	10	18,141	34	2,583	61	4,435	19	51,561	54	4	45	6	49	0	88	8	12	1	16	1	99	23	09
December.....	224,322	10,191	48	15,576	73	2,064	65	12,913	69	3,264	43	1,735	28	45,746	26	4	54	6	94	0	92	5	77	1	45	0	77	20	39
January, 1878.....	225,233	10,311	40	16,644	19	2,122	63	11,714	24	2,866	91	1,771	43	45,430	83	4	57	7	38	0	91	5	20	1	26	0	77	20	12
February.....	189,463	10,578	20	13,931	15	1,893	44	13,188	88	6,853	39	1,929	50	48,714	56	5	74	7	37	1	00	6	96	3	62	1	02	25	71
March.....	208,620	10,441	31	13,313	10	2,039	42	15,727	53	3,194	00	1,458	75	46,174	16	5	00	6	40	0	98	7	51	1	52	0	69	22	13
April.....	209,441	9,165	62	12,735	03	1,970	60	14,792	04	1,396	88	1,247	67	41,307	84	4	37	6	08	0	94	7	06	0	67	0	60	19	72
May.....	222,312	9,354	05	11,564	41	2,140	19	12,653	39	1,541	98	1,045	79	38,299	81	4	20	5	23	0	96	5	71	0	69	0	47	17	23
June.....	202,647	9,873	68	11,599	87	2,021	43	11,560	11	911	45	1,136	30	37,102	84	4	87	5	72	1	00	5	70	0	45	0	56	18	30
Totals.....	2,534,787	118,503	67	157,362	96	23,424	82	180,439	03	37,111	68	20,972	89	537,815	04	4	67	6	22	0	92	7	12	1	46	0	82	21	21

**E.—GENERAL STATEMENT of the Expenses of the Mechanical Department,  
Year ending 30th June, 1878,**

The miles run by trains were .....	2,100,080
"    engines were.....	2,499,068
"    cars .....	22,164,816
"    snow ploughs were .....	38,502
	<b>\$    cts.</b>
The cost of locomotive power was.. .....	537,815 04
"    repairs to cars.....	172,896 42
"    oil and waste for packing .....	10,785 84
"    repairs to passenger cars .....	64,950 23
"    "    postal, baggage and express.....	19,901 24
"    "    freight cars and vans .....	88,044 93
 The cost of locomotive power per 100 miles run by trains was .....	 24 94
"    "    "    "    engines.....	21 52
"    "    "    "    cars .....	2 42
 The cost of repairs to cars per 100 miles run by trains was.....	 8 00
"    "    "    "    engines.....	6 91
"    "    "    "    cars.....	0 78
 The cost of oil and waste for packing per 100 miles run by trains was .....	 0 49
"    "    "    "    engines .....	0 43
"    "    "    "    cars.....	0 05
 Repairs to passenger cars per 100 miles run by trains .....	 3 00
"    postal, baggage and express cars do .....	0 92
"    freight cars and vans do .....	0 47

**RETURN of Accidents, &c, Intercolonial Railway, from 1st July, 1877, to  
30th June, 1878.**

Date.	Place.	Person Injured.	Passenger or Employee.	Particulars.
1877.				
July 3.....	Moncton.....	Wm. Calhoun.....	Employee....	Whilst checking, leg and arm crushed by engine; injuries ultimately proving fatal.
do 4.....	Amherst.....	J. Cameron.....	do .....	Fell off car and broke his leg.
do 6.....	Stewiacke.....	Wm. Pollick and O. Corbett.....	Neither.....	Waggon containing men was struck by engine and smashed, and men slightly injured on Railway Crossing.
do 13.....	St. John.....	Archibald Brown.....	Employee....	Arm broken in three places whilst attempting to get on car in motion; injury ultimately proving fatal.
do 11.....	Oxford .....	.....	.....	Ballast train ran into freight train, engine and 9 cars damaged; conductor, driver, and brakeman all injured more or less.
do 23.....	3 Mile House.....	B. Weir.....	Neither.....	Walking on track, was run over and killed; verdict — "accidental death."
do 28.....	Richmond .....	Patrick Cronan.....	Employee....	Fell off top of car, head cut and body bruised.
Aug. 2.....	Pollett River.....	Charles Seely .....	do .....	Foot run over by engine; afterwards amputated.
do 14.....	Darlings Tank....	An old Indian .....	Neither.....	Struck by engine and slightly injured, sitting on track drunk.
do 13.....	Moncton .....	John Hamilton.....	Employee....	Side and hip hurt, coupling.
do 22.....	Bathurst .....	Ritchie Johnson.....	do .....	Fell off car, feet badly injured.
do 24.....	Wellington .....	Jas. Burris .....	Passenger....	do injuries slight.
do 28.....	Derby Siding.....	Wm. Hickey.....	Employee....	Hand injured whilst coupling.
Sept. 7.....	Oakfield.....	John Purdy.....	Neither.....	Found on track with both feet cut off. Verdict—"accidental death."
do 14.....	St. Croix.....	Nathaniel Kelly.....	Employee....	Crushed between car. Fatal.
do 13.....	Bloomfield.....	John Slow .....	do .....	Back badly injured, whilst coupling.
do 24.....	Dalhousie.....	Abraham Busby.....	do .....	Badly squeezed, whilst coupling.
Oct. 2.....	Rocky Lake.....	.....	.....	Horse and waggon standing on track; waggon smashed, horse and men escaped.
do 9.....	Amqui.....	.....	.....	Horse and waggon standing on track; waggon smashed, horse and driver escaped.
Nov. 7.....	2 Miles No. of Debert.....	.....	.....	14 freight cars went over embankment; 5 wrecked, 7 badly damaged.
do 9.....	Stewiacke.....	.....	.....	Coal train collided with No 17 freight train; 2 engines badly damaged and 1 coal car wrecked.
do 17.....	Ste. Flavie.....	J. C. Lane.....	Employee....	Hand crushed, whilst coupling.
do 30.....	Rimouski .....	T. A. Ouellet.....	do .....	Finger broken, whilst coupling.
Dec. 25.....	Plumweseep .....	Abner. D. Freeze.....	Neither.....	Driving across track in front of engine; fatal; verdict—"accidental death."
do 30.....	Mill Stream.....	.....	.....	Train collided with engine, breaking pilot off.
Jany. 2.....	Causapsca.....	.....	.....	Train parted; after part collided with fore part, damaging three cars.
do 4.....	Sussex.....	D. Campbell.....	Neither.....	Engine struck and killed D. Campbell 150 yards off Oulton's Crossing.
do 5.....	Dorchester.....	Dr. Boicet.....	Passenger....	Attempting to get on cars in motion; foot run over.
do 8.....	St. Octave.....	.....	.....	Pullman and first-class car left track both damaged.
do 16.....	Moncton.....	P. Casey .....	Employee....	Getting on van; was run over and killed.
do 30.....	Rothesay .....	.....	.....	First and second-class and box cars off track.

RETURN of Accidents, Intercolonial Railway, &c.—*Continued.*

Date.	Place.	Person injured.	Passenger or Employee.	Particulars.
1878.				
Feb. 4.....	Between Amqui and Causapsal .....			Train off track; one passenger had his arm injured.
do 10.....	St. Octave.....	— Burns .....	Employee .....	Leg broken; engine running into train; four cars damaged.
March 2.....	Campbellton .....			Train off track; Pullman and postal car damaged.
do 9.....	Trois Pistoles.....	A. Dubie. ....	Employee .....	Struck by over-head bridge and killed.
do 19.....	Drummond.....			Thirteen cars left track; one damaged.
do 26.....	Richmond .....			Engine and four hoppers left track.
April 15.....	Wentworth.....			Engine left track.
do 29.....	Hopewell.....			Van left track and upset.
May 2.....	Salmon Lake.....	T. Woodman.....	Passenger.....	Fell off train into ditch; slightly bruised.
do 14.....	Bic .....			Train left track, caused by rock slide; engine thrown down embankment; baggage, second-class and postal cars damaged.
do 14.....	Pictou Landing..	C. McGregor.....	Neither.....	Jammed between cars; verdict— “accidental death.”
do 24.....	Amherst.....	— Buchanan .....	Employee .....	Caught between cars; hip dislocated.
do 18.....	Painsec.....			Engine and four cars left track.
do 27.....	McCulloch Sid'g.			Train divided; train No. 9 ran into rear division; damaged van; two coal cars off track.
do 28.....	Point du Chêne..	J. O'Brien.....	Employee .....	Jammed between cars whilst coupling; died next day; verdict—“acci- dental death.”
do 31.....	Trois Pistoles.....			Land slip; threw off engine, smashing tender and damaging engine and two cars.
June 7.....	Moncton .....	Peter Dawson .....	Neither.....	Laying on the track; was struck by engine and his toes smashed.
do 6.....	Bathurst.....			Thirteen hoppers left track; four broken.

## APPENDIX No. 21.

## CANADIAN PACIFIC RAILWAY.

OFFICE OF THE ENGINEER-IN-CHIEF,

OTTAWA, 8th January, 1879.

SIR,—I have the honor to present my annual report on the progress made in surveying operations and construction to the 31st December, 1878.

## SURVEYS.

## SURVEYS IN THE EASTERN OR WOODLAND REGION.

A revision of portions of the location between English River and Keewatin was made during the past summer with a view to a reduction of work, some parts of the distance, owing to the nature of the country, being unusually heavy. The object of the Survey has been in part accomplished, but it has been found impossible to avoid all the obstacles met, and in consequence very heavy works of excavation will have to be undertaken on the section extending easterly from Keewatin to Eagle River, 67 miles.

## SURVEYS IN THE WESTERN OR MOUNTAIN REGION.

The operations in British Columbia during the past season were confined to a revision of the location between Emory's Bar, five miles below Yale, and the head of Kamloops Lake, by two parties.

The work on the portion from Emory's Bar to Spence's Bridge has resulted in an improvement in alignment and gradients, and a considerable saving in cost effected more especially in the large amount of protection and retaining walls shown in the estimate of last year.

The surveys of the past year have established that the River Fraser can best be crossed about six miles below Lytton; this crossing is a mile and a half above the point crossed by the previous survey, and considering the magnitude of the river and the extremely turbulent character of the current for a long distance, the crossing found is favorable. The bridge will consist of one main span of 300 feet with two side spans of 100 feet each. All the piers will be founded on the rocky banks of the chasm.

From Spence's Bridge to Kamloops Lake a material improvement has been made. The line, as previously located, involved a large amount of protection work. This has been avoided by throwing the line back from the river. The grades and alignment have also been improved and the distance reduced three-quarters of a mile.

A location survey has been made along the north side of Kamloops Lake, with a view to a comparison with the former location on the south side. This has resulted in shortening the line on this section three and a half miles, in reducing the curvature 800 degrees, and in materially lessening the cost of the work. The deflection from the original line occurs at a point five miles below Savona's ferry and crosses the Thompson River with two spans of 200 feet.



## WORKS OF CONSTRUCTION.

### TELEGRAPH LINE.

The telegraph between Fort William and Selkirk, Red River, 410 miles, has been so far completed as to admit of it being used during a portion of the past year.

There is now a continuous line between Lake Superior and a point in the longitude of Edmonton, a distance of 1,197 miles. At present, however, it is only being operated as far as Battleford, 967 miles. There is also a branch telegraph in operation between Selkirk and Winnipeg, a distance of 22 miles.

In British Columbia about 80 miles of the telegraph is reported completed, ready for operating from Cache Creek, eastwards. The partial chopping and clearing of the line extends 25 miles further being to a point 55 miles north of Kamloops.

### GRADING, TRACKLAYING, ETC.

#### *Fort William to English River, 113 miles.*

The grading and bridging is sufficiently completed between the above named points to admit of tracklaying. The rails have been laid to the 102nd mile. The ballasting is reported completed to the 60th mile, and is partially done for some distance beyond.

#### *Keewatin to Cross Lake, 36 miles.*

The work on this section is being prosecuted with considerable energy. Fully one-half of the rock excavation and a large quantity of earthwork has been done. The contractors have a large amount of plant and supplies on the ground, and there is every indication that the work will continue to be prosecuted vigorously.

#### *Cross Lake to Selkirk, 76 miles.*

The grading and bridging is completed on this section with the exception of a short distance at the eastern end, embracing heavy embankments. Steam shovels, aided by locomotives and cars, are engaged upon this work, and it will be completed in the course of a few weeks. The rails have been laid for 75 miles east of Selkirk, and ballasting has been done in detached sections, equal in the aggregate to about 14 miles of completed line.

#### *Pembina Branch, 85 miles.*

The section between Selkirk and St. Boniface, 22 miles, has been completed, including tracklaying and ballasting. From St. Boniface to Emerson the grading has been completed and the rails laid, but temporary structures have been used for the river crossings. These structures will be replaced by others of a more permanent character ultimately. The line will be ballasted during next summer.

### *Subsidized Lines.*

The Canada Central Railway extension is subsidized from Pembroke "to such point as may be selected by the Government as the terminus of the Canadian Pacific Railway at or near the crossing of the Nipissing road at the south-east corner of Lake Nipissing." The subsidy is limited to \$1,440,000. The distance from Pembroke to the crossing of the Nipissing road, the point named in the Order in Council, is estimated to be about 130 miles; 37 miles of this, commencing at Pembroke, have been located for construction; a location survey of the remainder has yet to be made. Of these thirty-seven miles, twenty-five miles are under construction, and a considerable portion of work done.

*Georgian Bay Branch, 50 miles.*

A contract was entered into on the 2nd of August last for the grading, bridging, tracklaying and ballasting required in constructing the line proposed to extend from a point on the western side of South River, near Nipissingan Post Office, to a point on French River about five miles east of Cantin's Bay, the distance being about fifty miles. The contractors have made some progress in erecting stores, and in forwarding supplies to points along the line, but construction so far has been confined to clearing portions of the line.

*Engine House at Selkirk.*

A contract has been entered into for the erection of a ten-stalled engine-house on the station grounds at Selkirk, but the building has not yet been commenced.

CONTRACTS.

A schedule of contracts upon which expenditure has been made during the fiscal year ended 30th June, 1878, is appended.

*Tenders for New Sections.*

The sections between English River and Keewatin (185 miles) and between Yale and Lake Kamloops (125 miles) have for some time been advertized for construction. The necessary papers for the former section are now being issued to intending contractors, and it is proposed to receive tenders before the end of January. This link of 185 miles placed under contract, the whole distance from Fort William, Lake Superior, to Selkirk in Manitoba, 410 miles, will be under construction. The terms of the proposed contract will, it is believed, secure a vigorous prosecution of the work, and the completion at the earliest day practicable of this important link in the Pacific Railway. The reception of tenders for the work between Yale and Lake Kamloops, in British Columbia, has been postponed.

*Tenders for the Whole Line.*

During the past summer advertisements were widely published in England and this country, inviting proposals from capitalists and contractors for constructing and operating the whole line from the Province of Ontario to the Pacific Coast, the distance being about 2,000 miles. All information was furnished on application, and tenders were to have been sent in by the 1st of this month. No offers within the required conditions have however been received.

I have the honor to be, Sir,

Your obedient servant,

SANDFORD FLEMING,

*Engineer-in-Chief.*

F. BRAUN, Esq.,

Secretary Public Works,

Ottawa.

Since the above was in type, one proposal for the whole line was opened on 30th January, 1879 when the tenders for the Sections, between English River and Keewatin, were opened.

S. F.

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## CANADIAN PACIFIC RAILWAY.

SCHEDULE OF CONTRACTS with Statement of Expenditure upon the same, during the Fiscal Year ended 30th June, 1878.

Contract No.	Character of Works.	Date of Contract.	Name of Contractors.	Amount expended during Fiscal Year ended 30th June, 1878.
1	Construction of Telegraph Line, Fort Garry to Livingstone.....	1874.	Sifton, Glass & Co. ....	\$ 5,655 93
2	do do Livingstone to Edmonton.....	do 30.....	R. Fuller .....	3,280 00
3	do do Edmonton to British Columbia.....	Nov. 10.....	F. J. Barnard ....	7,015 09
4	do do Lake Superior to Fort Garry.....	1875.	Oliver, Davidson & Co. ....	89,059 16
5	Pembina Branch { Extension St. Boniface to Selkirk, grading, bridging } and tracklaying. ....	1874.	Joseph Whitehead .....	100,610 00
13	Fort William to Sunshine Creek, grading and bridging .....	1875.	Sifton & Ward.....	42,000 00
13	do do completion grading, &c.....	April 3.....	Purcell & Ryan.....	13,700 00
14	Red River to Cross Lake, grading and bridging .....	April 3.....	Sifton & Ward .....	250,750 00
15	{ Cross Lake to Rat Portage, grading and bridging. .... } { Red River to Rat Portage, grading and ballasting. .... }	1877.	Sutton, Thompson & Whitehead.....	532,200 00
25	{ Sunshine Creek to English River, grading and bridging .. } { Fort William to English River, tracklaying and ballasting..... }	1876.	Purcell & Ryan.....	687,500 00
26	Ten Stall Engine House, at Fort William .....	June 6.....	James Isbester .....	18,831 00
32a	Station Houses, between Fort William and English River. ....	July 17.....	Lemay & Blair.....	17,730 45

## APPENDIX No. 22.

## REPORT OF THE MONTREAL HARBOUR COMMISSION.

HARBOUR COMMISSIONERS OF MONTREAL,

SECRETARY'S OFFICE,

MONTREAL, 11th November, 1878.

SIR,—In compliance with your circular, I beg now to send herewith for the information of the Honourable the Minister of Public Works, copy of the report of our Chief Engineer, made to the Commissioners, on the deepening of the ship canal between Montreal and Quebec, up to the close of the fiscal year.

I have the honor to be, Sir,

Your most obedient servant,

H. D. WHITNEY,

*Assistant Secretary.*

F. BRAUN, Esq., Secretary,

Department of Public Works,

Ottawa.

HARBOUR COMMISSIONERS OF MONTREAL,

CHIEF ENGINEER'S OFFICE,

MONTREAL, 9th November, 1878.

H. D. WHITNEY, Esq.,

Assistant Secretary, &amp;c.

SIR,—I beg as directed to furnish for the Department of Public Works, the following report on the work of deepening the ship channel between Montreal and Quebec, for the Government fiscal year ended 30th June last.

Work has been carried on at the undermentioned places, embracing all the points in the river at which the depth is less than 23 feet at low water. The channel is as hitherto, being dredged to 300 feet in width in the straight portions with enlargements of 400 to 500 feet in width at bends, entrances and other important points. The depth presently made is as a rule  $22\frac{1}{2}$  feet at low water, but in places where the bottom is lumpy, and the cutting does not extend over the whole area, the dredging is generally taken out at once to a depth of 25 feet.

The aggregate quantity of dredging for the Government year ended 30th June is 1,224,270 cubic yards, as against 1,202,288 cubic yards in the preceding year.

The expenditure on working account which is made up only to the end of the Harbour Commissioners' year ending 31st December, was for 1877 \$137,830, with an aggregate of 1,262,308 cubic yards dredged, as against \$130,744 for 1876, with an aggregate of 922,808 cubic yards dredged.

The floating plant employed in the work consists of:

- Eight elevator dredges.
- One spoon dredge (part of the time)
- Seven screw tugs.
- One side wheel steamer.
- One stone-lifter with steam gear.
- One do do with hand gear.
- Five barges (coal tenders and storeship.)
- Eighteen hopper bottomed scows.
- Two flat deck scows (part of the time.)

*Cap Charles.*—Dredging was continued throughout the summer of 1877 in the shale rock forming the Grondine shoal, and by the close of navigation of that year, a channel had been cut 300 feet wide and 21 feet deep at ordinary low water, with the exception of a small area of boulders and rock at the upper margin of the shoal. The total quantity of rock and boulders raised during the portion of the fiscal year in which work was carried on, was 8,248 cubic yards, at an average cost of about \$1.46 per cubic yard.

*Cap La Roche.*—The cutting of the new straight channel through the shale rock shoal was carried till the close of navigation in 1877 with one elevator dredge assisted during a considerable part of the time by a spoon dredge and a stone lifter. On the opening of navigation this year, work was resumed by two elevator dredges with improved equipment and assisted by a new steam stone lifter. With the exception of occasional hard veins, the shale is sufficiently soft to allow of its being torn up by the dredges without blasting. During the fiscal year, 16,750 cubic yards of rock and boulders were raised at an average cost of about \$2.34 per cubic yard.

*Cap Levant and vicinity.*—Recent careful surveys have led to the adoption of new lines of channel for this locality, and work upon them was commenced in August last year, and resumed in the spring of this year. Up to the 30th June, 14,180 cubic yards had been raised, and the work is still in progress.

*Becancour.*—The removal of a small shoal of boulders and clay which interfered with the turn of the channel at the south end of the Becancour traverse was commenced late in 1877, and continued this year. At the 30th June, 2,650 cubic yards had been dredged, at an average cost of about 94 cents per cubic yard.

*Lake St. Peter.*—The extensive work of deepening the channel through the lake was vigorously carried on both in 1877 and 1878, and by the end of the fiscal year the main cuttings were all practically completed to 300 feet wide and 33½ feet deep at low water, leaving only the bends, entrances and trimming up to be done to finish the dredging to that depth. During the year ended 30th June the total quantity dredged was 821,800 cubic yards, at an average cost of about 5½ cents per cubic yard.

*Contrecoeur channel.*—At the beginning of the year the work which remained to be done in order to fit the new channel for use was the cutting through of a shoal about half a mile in breadth at Ile St. Ours. This was completed in the end of August, after which the channel was buoyed out and opened for heavy draft vessels on the 19th September 1877. The present depth of the channel is 22½ feet at low water and the breadth is 300 feet with enlargements at the mouth and bend. The total dredging done from the beginning of the fiscal year to the date of opening was 26,900 cubic yards, at an average cost of about 20 cents per cubic yard.

*Pointe Marie.*—Careful surveys of the locality made in the summer of 1877, showed that the channel could best be improved by cutting away the north side of the *poulier* which stands nearly in the middle of the channel, and dredging was accordingly commenced upon it last autumn and resumed in spring. At the end of the fiscal year a very considerable straightening of the channel had been effected, and 10,720 cubic yards had been raised, at an average cost of about 27 cents per cubic yard.

*Varennes.*—Full hydrographic surveys were also made in this locality, and on the information obtained, dredging was commenced last fall for the removal of the most troublesome shoals, and to reduce the channel to regular lines capable of being

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easily marked out and followed. The dredging was done to 25 feet depth at low water, and 91,530 cubic yards were raised at an average cost of 15 cents per cubic yard.

*Pointe aux Trembles.*—Work was continued throughout the summer of last year and the spring of this year with two to four dredges and by the 30th June there remained only a part of the bend and of the lower entrance to be dredged.

The straight portions of the channel are 300 feet in width and the bend is 500 feet. Nearly the whole area dredged to the end of June is 25 feet in depth, and the small remaining portion is 22½ feet depth at low water. The quantity dredged for the year is 229,480 cubic yards, at an average cost of about 13½ cents per cubic yard.

I am, sir,

Your obedient servant,

JOHN KENNEDY,

*Chief Engineer.*

## APPENDIX No. 23.

### REPORT OF THE QUEBEC HARBOR COMMISSIONERS.

HARBOUR COMMISSIONERS OFFICE,  
QUEBEC, 12th November, 1878.

SIR,—In compliance with the instructions contained in the circular from your Department dated the 27th September last, I have the honor to report as follows on the various works done under the Harbour Commissioners during the year 1877-78.

#### *Graving Dock.*

During the latter part of the year 1877 the Commissioners resolved to proceed with the dock excavations at Point Lévis. A commencement was made on the 12th November, and the work was continued without intermission until the month of April last, when tenders for the completion of the entire works were invited by the Commissioners. The entire quantity of excavation up to that time was 10,267 yards. The total expenditure connected with this work, up to the 1st instant, amounts to \$24,685.29.

These works were finally contracted to Messrs. Larkin, Connolly & Co. on the 17th August last, for a sum of \$330,932.00, since which time the contractors have continued the excavation to one foot below coping. The Government wharf, forming the abutment of the western wing wall of the dock works, having been filled in with spoil and suitable refuse from the rock cutting and excavation.

#### HARBOUR IMPROVEMENTS.

##### *River St. Charles.*

During the winter of 1877-78, the damage done to the works in progress was slight, the extraordinary mildness of the season doubtless contributed to this result, but the fact is worthy of record as a test of general stability.

During this period beyond the improvement, repair and increase of the contractors' plant, little beyond the preparation of timber and miscellaneous iron-work was done by the contractors. In the construction of new and improved plant and other appliance much energy was displayed, and the following engine moved and labor-saving tools were placed on the works to commence operations in the spring:—

One clam-shell dredge of the largest kind yet manufactured;

One dipper or shovel dredge on the principle of the well-known Steam Navy, equal to moving at each dip 84 cubic feet of material or upwards of 3 cubic yards;

One steam-revolving derrick of 110 feet radius, or 220 feet diameter, carrying buckets of equal capacity with the dipper dredge;

Two steam tugs, two pile engines, six hoppers and other barges, and one double cylinder concrete mixer.

The works which are under contract with Messrs. Peters, Moore & Wright, as referred to in my report dated the 10th of January last, addressed to the Honorable the Minister of Marine and Fisheries, form a section of a general scheme for harbour improvements in the River St. Charles as proposed by Messrs. Kinipple & Morris in their report of November, 1874.

This section includes the construction of a length of embankment of 300 feet in width the entire distance between the ballast wharf and the gas wharf, and only a short space from the present terminus of the North Shore Railway, with which it is ultimately intended to connect it.

A ship channel 150 feet wide and a quay wall on a concrete foundation are in course of completion for an entire length of 3,500 feet. These forming part of a tidal harbour and wet dock respectively on a line to be determined by the production of Peters street or Dalhousie street or partly of both.

The work for the year 1878 has been solely continued from the ballast wharf end, obviously the better course unless a commencement at both had been within the resources of the contractors.

The outer open cribwork forming the northern face and foundation of the slope of the embankment has been completed to coping level on the first 120 feet forming part of the 582 feet in length reported in position and completed to 9 feet above low water last year, and a further extension has since taken place of 1,500 feet, in direction of the gas wharf, out of 3,030 feet required to complete a junction with the cribwork at that end of the works previously reported of 798 feet in length.

The excavation of the deep trench and the 150 feet deep channel of the ultimate tidal basin has been continued and nearly completed with the exception of the slopes and final grading to a length of 1,250 feet or nearly the entire deep water section.

In the deep trench nine 120 feet cribwork caissons have been sunk and concreted up to 3 feet above low water, preliminary to planting, on the 12-inch rock elm capping under the ashlar masonry of the stone face which is to have a height of 24 feet to coping level, including, with the concrete foundation, an entire height of 48 feet, 24 feet of which is below water spring tides.

The timberwork of the deep cribwork caissons has a special character, at the sametime embodying the best form of construction, in its front face of solid entremise filling dovetailed into the cross ties. In the cross sections considerable novelty has been introduced by the insertion of blocking pieces between the corps-morts or cross-ties, which being notched in half-inch and otherwise closely fitting, give great strength to the work, producing such a distance between the crossties vertically as insures the solidity of the concrete placed in the intervening spaces and compartments of the cribwork, as to make it really constitute one solid mass or monolith throughout.

The timber work has been most carefully constructed by the contractor, Mr. Simon Peters, of Quebec, and afterwards sunk in position, not without difficulty, but after some time with complete success.

One of these cribs in progress of construction is shown in photograph No. 1, accompanying this report.

The concreting of these deep cribs has been effected in the most approved method in general use, adopting skips or boxes of as large a size as possible, with spring and trigger doors opening below. They are made to contain one cubic yard of concrete, the sides being continued down the full depth of the doors when open, so as to prevent wash and disturbance, and also to insure the deposit at once of the combination of sand, broken stone and cement in the form in which it is placed in the skips.

Nine thousand yards have in this way been successfully deposited, levelled below by divers and brought up to the level of 3 feet above low water, ready to receive a finishing course on which to commence the stone face at the back of the elm capping.

A general view of the cribs sunk and concreted as far as No. 7 is shewn in photograph No. 2, annexed to this report, weighted with stone to be used for back filling. This excellent picture shews in cross sections at the end of crib No. 7, with regard to low water, and the success with which the general line and level of the cribwork blocks have been maintained.

It further shows the contractors' plant in position, particularly well the large dipper dredge and the 220 feet diameter derrick with the three divers and others of the men employed.



The expenditure on account of these works up to the 1st instant, has reached one hundred and fifty-five thousand seven hundred and forty-seven dollars and eighty-five cents (\$155,747.85.) A further amount of thirteen thousand five hundred dollars (\$13,500) has been paid to the contractors on the 7th of the present month, and a new estimate will have to be paid at the end of the month for work executed by them since that date.

The whole of the works has been performed under the superintendence of the resident Engineer, Mr. Woodford Pilkington, M.I.C.E., whose ability has given great satisfaction to the Commissioners.

It may be well to recur in conclusion to the importance of the works now in progress forming part of a scheme for the perfect accommodation of some 110 vessels at one time of an average length of 250 feet or of 1,600 for the working season, connecting at the same time the North Shore Railway at once with deep water quay walls, and presumably the entire western traffic of this line as far as Ottawa, next probably of Toronto and ultimately of the Pacific.

I have the honor to be, Sir,

Your most obedient servant,

A. H. VERRET,

*Secretary-Treasurer.*

The Honorable CHAS. TUPPER,  
Minister of Public Works  
Ottawa.

## APPENDIX No. 24.

REPORT OF THE OPERATIONS OF THE LIFTING BARGE FOR THE  
YEAR 1878.

HARBOR COMMISSIONERS' OFFICE,

QUEBEC, 4th January, 1879.

SIR,—I have the honor to report as follows on the operations of the Lifting Barge for the year 1878.

The barge having undergone a very severe test during the working season of 1877, as stated in my report for that year, was sent to Davies' Dock in order to have her repaired, in accordance with the recommendations of the Port Warden, Captain Dick.

On the 6th May the Port Warden forwarded the following report on the repairs done to the barge under his supervision :

"PORT WARDEN'S OFFICE,

"128 ST. PETER STREET,

"QUEBEC, 6th May, 1878.

"A. H. VERRET, Esq.,

"Secretary-Treasurer,

"Quebec Harbor Commissioners.

"SIR,—In compliance with your letter dated 13th April, 1878, I beg to inform you that the following repairs were found necessary to be made on the Lifting Barge before undocking.

"In addition to the diagonal iron straps originally on the inside (14) fourteen pairs have been added, viz : seven pair at each end of the vessel, all are through bolted with  $\frac{3}{4}$ -inch round iron clenched on rings. For placing the above straps parts of the cabins and flooring had to be removed which have been replaced."

The diagonal wood bracings each side of the well have been additionally treenailed. In the spaces of the cooking and engineers rooms the joints have been caulked and filled with wood battened over.

On each side of the well the vacant space over the heads of the stanchions have been filled solid with wood.

Outside the well has been caulked all over. The iron linings on its lower edges removed for caulking. All have been replaced ; six pieces of plates had to be renewed.

The stern and stern posts where there was indication of straining have been strengthened by (8) straps of iron bolted to each other through the stern and stern posts, and otherwise through bolted and clenched on the inside. One rudder brace broken, removed, repaired and replaced.

"The butts in bottom of bluff of bows and quarters have been additionally bolted.

"Caulking has been done from the keel to rails, including parts on deck-seams, have all been coated with pitch and rosin, the bottom coated with coal-tar, paint work above water line, twice coated with paint, including boats, etc.

" *On Deck*.—Iron stanchion sockets on both sides have been secured with new bolts. One additional scuttle-hatch has been made in midship on port side. Deck glasses with those broken in sky-lights have all been made good. Engine frames additionally fastened with screw bolts, and with sundry other iron work repaired.

" I am also of opinion that the work, as above enumerated, has been completed in a most satisfactory manner, and to the entire satisfaction of your

" Most obedient servant,

" JOHN DICK,

" *Port Warden.*"

These repairs, including the cost of docking the barge for the winter, have amounted to the sum of eleven hundred and ninety-one dollars and thirty cents (\$1,191.30).

Captain Claude Giguère was re-engaged in the month of April and took charge of the craft immediately after his appointment. He was directed to search and try to secure the two large nests of anchors and chains that were known yet to exist. In the beginning of May the barge was towed in the stream and the search was commenced without delay.

After two weeks of steady search, the Captain reported that he had failed to fasten the barge on either of the nests, although he had not abandoned hopes of securing them.

He was thereupon ordered to cease his search till further orders, and to raise the steamer "*Bidder*" sunk some ten years ago, in front of the ferry landing at Lévis.

After two months' work the whole wreck, comprising the engines, the boiler and the hull, was safely landed on Carrier's premises at Lévis.

The wreck having not been claimed under the authority of the 5th section of the 29th and 30th Victoria, chapter 59, was disposed of as provided by the section 2 of the 22nd Victoria, chap. 31. The sale only realized \$150.

The obstruction caused by this wreck was as dangerous, if not more so, to shipping than a nest of anchors, and all interested have learnt with satisfaction of its disappearance.

As soon as the lifting barge had landed the wreck, Captain Giguère received instructions to resume his search of nests of anchors and chains, for which he had already searched in the beginning of the season. His search proved again unsuccessful, and it has been consequently inferred that no more nests were in existence, or that if such really exist they were covered with sand, and were, as obstructions considered of no more consequence.

During his search the master of the barge has succeeded in raising 5 anchors and about 66 fathoms of chain. One of these anchors was claimed by its owners, the Allan Steamship Company, and delivered to them on payment of the salvage.

Amongst these anchors there is one which is the largest that has ever been raised by the barge. It weighs 3,985 lbs., and according to experts, must have been under water for at least 60 years. It has been established by marks thereon that it belonged to an English frigate.

The wreck of the steamship "*Ottawa*," sunk some sixteen years ago off the wharf belonging to the Montreal Ocean Steamship Company, has been surveyed during the month of August last, and the master of the lifting barge has reported that the whole wreck was covered with sand, and declared that he was of opinion that it could not injure the shipping, even if the sand over it were washed, inasmuch as it is so close to the wharf vessels are not supposed to anchor there.

On the recommendation of the Lifting Barge Committee it was agreed upon to order the barge on the Fly Bank, in order to remove the largest boulders that were considered the most dangerous obstructions.

The barge was at work about twenty days on this spot, and eighteen boulders were secured and removed. They were all of a very large size; one of them was

eight feet and another six feet high, the first weighing over twelve tons and the latter ten.

Some years ago a vessel belonging to the Allan Line touched the first mentioned boulder and sustained damages to the amount of \$8,000.

The question of raising the wreck of the ship known as "L'Original," sunk in the harbour since October, 1750, according to the *Jesuit's Journal*, was discussed during the summer by the Commissioners, and it was decided to remove that so long existing obstruction.

The captain of the barge was accordingly ordered to suspend the work of removing the boulders, and to commence operations on the wreck in question. After a thorough survey he reported the wreck 170 feet long, 40 feet beam, and under 95 feet of water.

It having been ascertained that this obstruction could not be removed without the aid of explosive material, a contract was entered into with the firm of Cochrane, Lewis & Co. of Montreal, by which they undertook, for the sum of one thousand dollars, to blow up the wreck with dynamite. They were bound to furnish their operator with explosive material and instruments, and all possible assistance was to be given by the lifting barge with her crew. It was also necessary to secure the services of a diver.

The work of blasting was commenced on the 24th September and continued, weather permitting, till the close of navigation. After each explosion the barge was engaged in securing the broken pieces of the wreck.

The work has been progressing favorably, but more slowly than anticipated, and about one-fourth of the wreck has been secured. At the end of the year's operations the whole of the salvage, consisting of a quantity of broken pieces, four beams and some timbers were safely landed on one of the wharves of the Commission.

Three anchors with thirty fathoms of chain have been also secured from the wreck.

Judging by the time it has taken to raise the portion of the wreck that has been blasted and removed, it will take at least four months to clear away the remainder of this obstruction. If you add to that the time it will take to remove the boulders that were left untouched inside the fly bank, the barge will be engaged the whole of the season of 1879 to complete the work remaining unfinished.

It is to be hoped that the Government will include in their estimates of next session the usual appropriation in order that the Commissioners may be enabled to continue the work of clearing the harbor.

By referring to the working expenses of the lifting barge for the two last years, it may be inferred that a sum of twelve thousand dollars (\$12,000), will be fully sufficient to meet the expenses of the coming season.

The annexed statement shows the cost of the barge, her yearly working expenses, also the yearly quantity of anchors, chain, etc., etc., saved by her since the beginning of her operations in 1875.

In conclusion I am happy to state that Captain Giguère, the master of the barge, has given as much satisfaction this year as in previous years.

I have the honor to be, Sir,

Your most obedient servant,

A. H. VERRET,

*Secretary Treasurer.*

To the Honorable CHAS. TUPPER,

Minister of Public Works,

&c. &c. &c.

Ottawa.

# QUEBEC HARBOUR

## LIFTING

STATEMENT showing the cost of the Lifting Barge, her yearly working of, and what

*(Annexed to the Quebec Harbour Commissioners' Report*

Cost of the Lifting Barge built in 1874-75.	Working expenses in 1875.	Working expenses in 1876, including repairs.	Working expenses in 1877, including repairs.	Working expenses in 1878, including repairs.	Quantity of Anchors, Chains, Boulders, etc., raised in			
					1875.	1876.	1877.	1878.
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.				
35,184 56	1,735 29	15,301 79	11,766 00	10,555 23	4 anchors and about 250 fathoms of chain.	57 anchors and 1,425 fathoms of chain.	101 anchors and 3,291 fathoms of chain.	8 anchors, 96 fathoms of chain, 18 boulders, the wreck of the steamer "Biddle," and about one-fourth of the wreck known as "L'Original."

N.B.—The anchors entered in the above Statement do not include 24 broken anchors which have  
 One of the eight anchors raised in 1877 was claimed by its owners, the Allan Steamship  
 One anchor belonging to the stock on hand was transformed into a grapnel in October, and  
 5 anchors and 7,210 lbs. chain sold for \$175.03 are yet unpaid.

## COMMISSIONERS.

## BARGE.

expenses ; also, yearly quantity of chains, anchors, etc., saved and disposed remaining on hand.

*on the operations of the Lifting Barge for the Year 1878.)*

Quantity of Anchors, Chains, etc., disposed of in				Quantity of Anchors and Chains on hand 31st Dec., 1878.	Product of the sale of Anchors, Chains, etc., in			
1875.	1876.	1877.	1878.		1875.	1876.	1877.	1878.
None.	11 anchors and 3,231 lbs. of chain.	36 anchors and 99,074 lbs. of chain, broken anchors, etc., sold as scrap.	14 anchors, 78,080 lbs. chain, 7 shackles and 1 stock.	86 anchors, about 300 tons of chain and 176 shackles.	None.	\$ cts. 839 88	\$ cts. 1,761 58	\$ cts. 1,447 18

also been secured and are classed as scrap. Twelve of these anchors were sold in 1877. Company, and surrendered on the payment of salvage. sent to the barge to replace one that had been broken.

Certified.

A. H. VERRET,  
*Secretary-Treasurer.*

## APPENDIX No. 25.

## FORT FRANCES CANAL.

OTTAWA, 22nd January, 1879.

SIR,—I have the honor to submit the following Report on progress made in construction of Fort Frances Canal and Lock carried on under my charge for the year ending 31st December, 1878.

As this work now is nearly completed, I presume it is only necessary to offer a few general remarks respecting expenditure, &c.

I regret that the cost of the past season's work has exceeded my expectations, notwithstanding every precaution was taken and rigid economy observed, obstacles presented themselves which were unavoidable and beyond the power of anyone to prevent or foresee.

As explained in my Report a year ago, one of the greatest difficulties was to find the oak timber for the quoins, mitre sills and gates, some of which is very large, and after expending a great deal of time and money in examining the country on both sides of the International boundary, it was at last discovered at the head of the Mississippi River, Minnesota, on an Indian reservation, two hundred and fifty (250) miles from Fort Frances. We had considerable difficulty in making arrangements with the various Indian Chiefs near "Bow String" Lake and other places, and after some time effected a satisfactory settlement. But some of the Tribes afterwards became dissatisfied and stopped the timber coming down the River, until another treaty was made. This delay prevented us getting down with the spring freshet. The timber was left for a period, waiting a rise of water, but before that time came, some persons cut and destroyed a portion of it.

This necessitated getting out more timber, but we were unable to find all we required—that is, the larger pieces. We succeeded in getting down the first raft, but the second had to be left on account of the very low stage of water, and is now about one hundred and fifty (150) miles up the River from Fort Frances. The vexatious delay and cost in endeavoring to accomplish the difficult task of getting this timber far exceeded our expectations, but it should be remembered that some of this timber is of such dimensions that it is not to be found even in Ontario or Michigan.

I have enquired extensively through northern Minnesota for offers to furnish the balance of the timber delivered F.O.B. anywhere on the Southern Pacific Railway, and I have forwarded tenders to the Department to supply it.

But in view of this everlasting timber trouble, I would most respectfully suggest that nothing more be done towards furnishing the gates, until the Canadian Pacific Railway is completed to Rat Portage, so that this oak timber can then be transported by rail, and thence easily carried to canal by water. This was suggested a year ago, and is the proper method of doing it. If, however, the Department decide to go on with the work, special instructions are required.

Another very expensive operation was trimming the bottom and sides of the canal, after completion of rock excavation. Owing to the very ragged manner in which the rock blasted, a great deal of loose and shattered rock had to be cut and removed, adding largely to the expense. The bottom of canal underneath mitre sill platforms, owing to its shattered condition, required a great deal of additional work in wedging, cementing, fronting, &c., in order to make a substantial, water-tight job, which, although somewhat expensive, I am glad to inform you is now completed in a thoroughly substantial manner, and I think the same can be said of every other portion of the work.

In accordance with my instructions I have removed the obstruction to navigation at the "Manitou" Rapids, Rainy River, by widening the chute, and it is now almost entirely removed, sufficiently so, at all events, to allow boats to steam up without the aid of ropes as heretofore.

That work is a decided success, especially in view of the small appropriation, namely, three thousand dollars (\$3,000). If the same amount could be appropriated for removing the boulders at the Long Sault six miles below, Rainy River would then be navigable for the largest boats at all stages of water, its entire length of eighty (80) miles). In reference to the plant on hand, I would say that the principal portion is in excellent working order, a great deal of it is as good as new, and very little would be classed as inferior. It is all available and ready for shipment, and ought to sell well to contractors on the Canada Pacific Railway on account of its convenience to the line.

I regret to state that two men, Charles Ferrin and James Gibson, are now at Fort Frances, laid up on account of injuries sustained while at work.

Charles Ferrin's case is of eighteen (18) months' standing, and although he has been able for some time to assist at light work, he is nevertheless a cripple for life, and totally unable to earn a livelihood. James Gibson, although badly injured shortly before the close of the works, will no doubt recover so as to be able to work next spring.

I venture to express the opinion that some recompence should be made them.

I have the honor to be, Sir,

Your obedient servant,

HUGH SUTHERLAND,  
*Superintendent.*

F. BRAUN, Esq., Secretary,  
Department Public Works,  
Ottawa.



## APPENDIX No. 26.

TABLE showing the dates of the closing of Canals and Harbours in Autumn of 1877, and the opening in the Spring of 1878.

Canals or Harbors.	Closing.	Opening.
Lachine Canal.....	4th December, 1877	6th May, 1878
Beauharnois Canal.....	6th do	24th April, 1878
Cornwall Canal.....	8th do	22nd do
Williamsburgh Canals.....	5th do	29th do
Welland Canal.....	5th do	9th May, 1878
Burlington Bay Canal.....	13th do	30th March, 1878
St. Ann's Lock and Dam.....	4th do	15th April, 1878
Carillon Canal.....	5th do	19th do
Grenville Canal.....	5th do	3rd May, 1878
Chûte à Blondeau Canal.....	5th do	3rd do
Rideau { Kingston Mills.....	1st do	1st do
{ Ottawa.....	3rd do	1st do
St. Ours' Lock.....	5th do	1st April, 1878
Chambly Canal.....	2nd do	1st May, 1878
Erie Canal (New York).....	7th do	15th April, 1878
St. Peter's Canal (Cape Breton).....	Closed since June, 1876.	
Quebec Harbor, River St. Lawrence.....	28th November, 1877	5th April, 1878
Montreal do do.....	2nd January, 1877.	30th March, 1878
Toronto Harbor, Lake Ontario.....	22nd December, 1877	30th do
Kingston do do.....	8th January, 1877	11th do
Belleville Harbor, Bay of Quinté.....	29th December, 1877	11th do
Port Stanley Harbor, Lake Erie.....	10th do	15th do
*Kingville do do.....	24th November, 1877	12th do
Windsor Harbor, River Detroit.....	21st December, 1877	18th do
Sarnia Harbor, Lake Huron.....	10th January, 1878	9th do
Goderich do do.....	15th December, 1877	18th do
Kincardine Harbor do.....	19th November, 1877	3rd April, 1878
Owen Sound Harbor, Georgian Bay.....	29th November, 1877	12th March, 1878
Collingwood do do.....	7th December, 1877	18th do
Midland Harbors do.....	27th December, 1877	20th do
River St. Mary do.....	30th November, 1877	8th April, 1878
River Kaministiquia, Lake Superior.....	28th do	6th do
Prince Arthur's Landing do.....	23rd January, 1878	16th March, 1878
Winnipeg Harbor, Red River.....	1st November, 1877,	22nd do

\* Reported steamers could have run to this port all the winter. Dates given are those of the last entry at Custom House.











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